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A STUDY OF THE COMPARABILITY
OF NAVAL ACTIVITY
MOTOR VEHICLE COSTS

by

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A Study of the Comparability of
Naval Activity Motor Vehicle Costs

by

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ABSTRACT

This thesis reports on a study conducted to determine the feasibility of using a sampling technique within the Department of the Navy to compare in-house motor vehicle costs with the costs that would be incurred were the General Services Administration or a civilian fleet management contractor employed to meet the Navy's motor vehicle needs. Such cost comparison studies are required by the Consolidated Omnibus Budget Reconciliation Act of 1985 (Public Law 99-272).

The doubtful quality and wide dispersal in the available data on Naval activity in-house costs made it impossible to determine if costs are sufficiently similar between activities to justify the use of a sampling technique. It was recommended that the Navy remain watchful through the cost study process for indications that sampling may still be a viable technique. Additionally it was recommended that the cost reporting system be improved.

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I. INTRODUCTION

A. BACKGROUND

On April 7, 1986 the Consolidated Omnibus Reconciliation Act (COBRA) of 1985 was signed into law. This Act established the United States federal budget for Fiscal Year 1986. Consistent with a common Congressional practice, this piece of legislation was also used by Congress to set policies and give directions that were not specifically related to the primary function of the Act. One such manifestation of this practice is found in Chapter 20 of COBRA. This Chapter requires, among other things, that all Federal Agencies complete studies that compare their in-house costs of providing motor vehicle transportation to the costs of obtaining these services from the General Services Administration (GSA) or a commercial provider [Ref 1]. This requirement was obviously an attempt on the part of Congress to insure that the Federal government meets its motor vehicle needs as cost effectively as possible.

This requirement placed no small burden on Federal Agencies. Little specific guidance with regard to interpreting the law and implementing its requirements was provided. Consequently, a multitude of questions arose regarding COBRA's requirements. To date many of these questions remain at least partially unanswered. For this

reason, the Department of the Navy (DoN) has made little progress in developing a plan to complete the studies required by COBRA.

B. OBJECTIVES OF THIS STUDY

The researcher was advised that the most pressing issue for DoN, with regard to COBRA Chapter 20, was the need to develop a general approach to completing the cost comparison studies [Ref. 2]. The Navy, of course, was interested in using the lowest cost process that could be shown to yield reliable results to complete the studies. The most promising potential strategy that had been identified was the possible use of a sampling technique.

Such a technique, if found to be feasible, would allow DoN to perform in-depth cost studies at selected activities and determine from the results of these studies if the larger group of activities represented by the sample group were meeting their transportation needs at costs competitive with GSA and the commercial sector. If such inferences could be drawn it might, then, be possible to preclude the need to expend the substantial amount of time and money that would be necessary to complete an in-depth cost study at each Naval activity. The feasibility of using such a technique depended mainly upon the extent to which Naval activities could be categorized by similarities in their unit transportation costs.

C. THE RESEARCH QUESTIONS

The overriding question this thesis undertook to address is the feasibility of using a sampling technique to complete the studies required by Chapter 20 of COBRA. Such a technique would only be justifiable in groups of activities with very similar unit costs of providing motor vehicle transportation. The research for this thesis was conducted, then, in the hope of determining, through a study of the unit transportation costs of a group of activities, if the use of a sampling technique was justifiable.

D. SCOPE OF THE STUDY

A very natural follow-on question to the main question addressed by this thesis is: Are Naval activities, in general, competitive with GSA and the commercial sector in meeting their motor vehicle needs? So natural was this question that the researcher had to make a conscious effort not to be sidetracked by it. The purpose of this study was to determine the degree of similarity between in-house Navy transportation costs, not the degree of competitiveness with outside providers.

The researcher began this study with the hope of also studying the question of how activities should be grouped when bids for transportation services are solicited from GSA and civilian fleet management contractors. It was recognized

that factors other than similarities in transportation costs bore on this question. For example, a study of transportation costs might have shown that within functional categories activities have very similar costs. It is conceivable, though, that some factors unrelated to cost similarity (e.g., desires to allow Public Works Centers to "bid" on activities in their area, or to make the administration of any contracts resulting from the study more simple) might imply that activities should be grouped by region, not function, when bids are solicited. The level of effort required to address the primary issue of this study, though, precluded the possibility of looking substantively into this second question.

E. LIMITATIONS TO THE STUDY

Three main limiting factors are notable with regard to the study effort reported on by this thesis. Two of these were imposed upon the researcher by the nature of the data gathered. The other, the researcher himself imposed on the study effort. Each of these limits the conclusions that can be drawn from the data analysis in some way. The first also limited the scope of the study.

1. Lack of available data

The researcher initially hoped to study Naval activities representing a wide range of functions, sizes, and regions. It was discovered, though, that transportation cost

data at many activities were not available. The only type of activity found to consistently maintain the type of cost data needed for this study was Naval Air Stations. The scope of this study was reduced accordingly. The modified goal of the study became to determine the degree of similarity in transportation costs at Naval Air Stations.

2. Questionable quality of the data collected

The researcher was advised that the cost data provided by activities were, in some cases, inaccurate. In the data analysis process the researcher observed a number of apparent discrepancies in the data collected. The researcher felt, then, that the ability to reach definitive conclusions based on the data was limited by the level of doubt that existed about the quality of the data.

3. Cost data were studied for only one year

The researcher recognized that it would be impossible, within the time available to complete this thesis, to study in detail, cost records from more than one year. Cost data from fiscal year 1992, then, were the only data examined. This limitation increased the probability that some of the data collected might be reflective of a rare situation and not be representative, therefore, of normal transportation costs. Though no evidence was uncovered during the data analysis to suggest that such a situation existed, its possibility could not be dismissed.

F. ASSUMPTIONS

The primary assumption made by the researcher in developing the study methodology was that the only costs relevant to the questions being addressed by this thesis were direct fuel, labor, and materials costs. The researcher assumed that the overhead-type costs (procurement, disposal, management, and administrative costs) were similar between activities and, so, were irrelevant to the effort to determine the degree of similarity among the transportation costs of Naval activities. Since all Naval activities procure and dispose of their vehicles through the same two organizations, the assumption with regard to unit procurement and disposal costs is felt to be valid. Toward the end of the study, however, the researcher began to doubt the assumption regarding the irrelevance of management and administrative expenses in activities' transportation organizations. The researcher's conclusions in this regard are discussed briefly in Section H of this chapter, and more fully in Chapter VI.

G. STUDY METHODOLOGY

The collection and analysis of cost data on each activity was the cornerstone of the study effort for this thesis. The researcher recognized, though, that there existed many nonfinancial factors that likely influence transportation costs. An effort was made then, primarily through interviews with Navy transportation experts, to identify the nonfinancial

factors most likely to significantly influence transportation costs. The researcher sought to gather about each activity, facts on these nonfinancial characteristics. The cost data were analyzed with reference to different combinations of nonfinancial characteristics. This was done in the hope of identifying the activity-specific characteristics that affect transportation costs at Naval activities. Such an identification would possibly have justified using a sampling technique to complete the COBRA studies within groups sharing a set of nonfinancial characteristics.

H. CONCLUSIONS

1. Data do not justify using a sampling technique

The data gathered proved to be of doubtful quality, widely dispersed, and completely unpredictable in their fluctuations. The latter two characteristics taken together, in the opinion of the researcher, indicate that the data are, in general, unreliable. Given these facts, it is impossible to determine from this study if sampling would be a valid approach to completing the COBRA studies. It can only be said that the data analysis of this study provides no justification for such an approach.

2. Difficulty in identifying a set of cost driving factors

The researcher analyzed the data with reference to a number of nonfinancial characteristics of activities and their

vehicle fleets. It is conceivable that different combinations of these characteristics are the primary cost drivers at different activities. It is also likely that there are other factors that influence transportation costs at Naval activities. It may be impossible, then, to identify a generic set of characteristics that prove to be consistently predictive of activity transportation costs.

3. Need for improvement in the Navy's transportation cost reporting system

This conclusion is an obvious follow-on to the first conclusion cited. The apparent lack of a reliable cost reporting system among Navy transportation organizations is a significant deficiency. It will likely make completing the COBRA studies more difficult. If the Navy proves, as a result of studies based on the existing data, to be a less cost effective provider of transportation than GSA or civilian contractors, one possible explanation is that the system in place for tracking costs is ineffective. Clearly it will be difficult for Navy transportation organizations to operate as effectively and efficiently as the current austere budget environment requires without a more reliable cost reporting system.

4. Relevance of management and administrative expenses

It is not clear whether the size of the administrative and managerial staffs at transportation organizations is more

related to fleet size, level of usage or other factors. Without investigating this issue it is not valid to assume that these costs will not affect the degree of similarity in transportation costs between activities. Given the generally poor quality of the data evaluated for this thesis, though, incorrectly assuming these costs to be irrelevant to the question at hand proved to have no affect on the conclusions made.

I. RECOMMENDATIONS

1. Plan first studies such that results might indicate if sampling is possible

Given the questions about the quality of the data analyzed for this study, no conclusion is possible about the existence or absence of transportation cost similarities between activities. The potential cost savings of using a sampling technique to complete the studies are too significant to eliminate it as an option. In choosing the first activities where COBRA cost studies will be conducted, consideration should be given to what comparisons of the results of these studies might imply with regard to the possibility of using sampling for future studies.

2. Improve transportation cost reporting

The conclusion about the current cost system stated in section H above shows why this is necessary. The lack of training among transportation employees with respect to the

reporting system, the problems with the computers and software used to produce the cost reports, and the reliance upon several different organizations to prepare the reports all need to be addressed if the system is to be improved.

J. ORGANIZATION OF THE THESIS

Chapter II is a detailed discussion of the problems presented to DoN by COBRA and the process by which the researcher defined the area of study for this thesis. Chapter III explains the specifics of how the activities to be studied were chosen, how it was decided what data to gather, and how the data were gathered. The data that were gathered are presented along with some broad observations about them in Chapter IV. The in-depth data analysis and interpretation process is described in Chapter V. Chapter VI presents the main conclusions the study generated, some recommendations relative to the conclusions, and some issues related to this study that need to be researched further.

II. BACKGROUND

Chapter 20 of the COBRA is entitled Federal Motor Vehicle Expenditure Control. Section 905 of this Chapter requires that

> each executive agency, including the Department of Defense, shall conduct a comprehensive and detailed study of the costs, benefits, and feasibility of--
>
> (A) relying on the Interagency Management Fleet system operated by the Administrator;
>
> (B) entering into a contract with a qualified fleet management firm or another private contractor; or
>
> (C) using any other means less costly to the Government,
>
> to meet its motor vehicle operation, maintenance, leasing, acquisition, and disposal requirements.
>
> (2) each study conducted under paragraph (1) shall compare the costs, benefits and feasibility of the alternatives described in subparagraphs (A), (B), and (C) of such paragraph to the costs and benefits of the agency's current motor vehicle operations and, in the case of the alternatives described in subparagraphs (B) and (C) of such paragraph, to costs, benefits, and feasibility of the use of the Interagency Fleet Management System operated by the Administrator. [Ref. 1]

Section 913 of this Chapter defines "the Administrator", as used in Section (A) in the above quote, as the Administrator of GSA. The Office of Management and Budget (OMB) is responsible for ensuring the enforcement of COBRA's requirements.

The requirements set forth above can be summarized as follows: Each Federal Agency shall compare their current costs of providing, maintaining, operating, and disposing of their vehicle fleets to the costs that would be incurred were GSA, or a civilian fleet management contractor, employed to provide those services. "Operating", as it applies here, means to provide fuel. Civil service or military drivers will still be required. Although the law does not specifically require that the least costly alternative be used, clearly that is the intent.

There have been many questions and many problems generated because of the requirements discussed above. Largely as a result of these, to date, DoN has made little progress toward complying with COBRA. The following section is a brief discussion of some of the major questions and problems. The multi-faceted nature of this problem helps explain DoN's lack of action in responding to Chapter 20 of COBRA. It is hoped that this section will help the reader appreciate the somewhat chaotic environment in which this issue has evolved.

A. MAJOR QUESTIONS AND PROBLEMS PRESENTED BY CHAPTER 20 OF COBRA.

1. Which vehicles?

What motor vehicles did the law refer to? Obviously all passenger-type vehicles, i.e., those that GSA commonly provides, would be included in the COBRA studies. However,

the types of vehicles owned and operated by Federal Agencies range from motor scooters to industrial cranes. Neither GSA nor any individual fleet management contractor can provide the full range of vehicles used by Federal Agencies. Chapter 20 of COBRA allows GSA to identify the "special purpose vehicles" that are not to be included in the studies [Ref. 1]. Until these vehicles were designated the studies could not be completed.

2. What about the CA studies?

How did the requirements of COBRA affect the Commercial Activities (CA) studies already completed, currently underway, and scheduled for the future? Department of Defense (DoD) Instruction 4100. 33 requires that commercial organizations be offered the opportunity to provide a wide range of services on military installations if it can be shown that they can do so more cost effectively than a civil service or military organization [Ref. 3]. Commercial organizations are to be offered this opportunity by way of a sealed bidding process. If a responsive bid (i.e., a realistic bid from a legitimate organization) with a bid amount lower than the government in-house estimate is received, a contract is to be let to the low-bid organization to provide the relevant services.

Typically when a CA study is done, a wide variety of services of a public works nature (utilities, facilities,

transportation, etc.) are put out for bid as a package. At the time COBRA was signed into law, transportation fleet management had already been put out for bid as a part of one of these larger bid packages at many activities. Were bids now to be solicited for just the transportation function at these activities? Should the transportation function be put out for bid separately in the future? The answer to these questions was contingent upon the answer to a more basic question.

3. What kind of study is required?

Chapter 20 of COBRA required only that studies be done and comparisons be made. No method was specified for making any changes that the results of the studies might recommend. Would a CA type bidding process for just the transportation function be necessary?

4. How to "level the playing field"?

Given the differences in the way military/civil service organizations, GSA, and civilian organizations are operated and funded, how could costs of these organizations be evaluated to determine which organization would truly be the low cost provider? This question became known as the "level playing field" issue.

Military organizations procure vehicles with one set of funds through the Civil Engineer Support Office (CESO), operate and maintain them at the activity level with another

set of funds, and credit yet a third account with any money collected from the resale of vehicles accomplished through the widely dispersed branch offices of the Defense Reuse Management Office (DRMO). With such a fragmented fleet management organization and accounting system, precisely answering the question of how much it costs to provide transportation is not a trivial matter.

In the CA study process, transportation cost comparisons were made strictly on the basis of operation and maintenance costs. This is because it was assumed that a successful bidder would simply assume operation and maintenance responsibilities for the existing fleet. Procurement and disposal would continue to be accomplished through military organizations; therefore, these costs would be common between the two bids and irrelevant to the "low cost" question. GSA, though, provides its own procurement and disposal services. A government cost estimate then will have to include procurement and disposal costs to be comparable to a GSA estimate. The task of gathering these costs and matching them to the appropriate activity will be formidable. It will entail determining what portion of the costs of many different organizations/functions (fuel farms, supply warehouses, NAVFAC and its field offices, controller's department, CESO, and DRMO) relate to the procurement, operation, maintenance, and disposal of vehicles at individual activities.

New costs that will be incurred by the government if fleet management responsibilities are given to GSA or a contractor must also be identified and considered if a true cost comparison is to be made. Contract administration expenses and transition expenses (costs to convert to a new provider) are the primary examples of such costs. Likewise, care must be taken to recognize in-house transportation costs that won't completely go away if a conversion is made to another fleet management organization. For example, in some cases, vehicle mechanics also double as vehicle operators [Ref. 4]. Since neither GSA nor a contractor would be expected to provide drivers for the vehicle fleet, it would be incorrect to assume all labor costs would be totally eliminated if another provider was brought in.

5. Public Works Center (PWC) consolidations and Defense Business Operating Fund (DBOF) conversions

Navy PWC's are regional organizations that can provide a wide range of public works services, including motor vehicle fleet management, to Naval activities in their area. DBOF is a recent DoD funding innovation designed to make defense activities more aware of their cost of doing business and correspondingly, it is hoped, more cost effective. Organizations using DBOF finance their operations from a revolving fund and bill the recipients of their services.

In concert with DoD cost cutting mandates, the Navy has been in the process of using PWC's to provide public works services to more and more activities. Likewise many activities have been converting to the DBOF method of funding their operations in an attempt to become more cost effective. The Navy's dilemma is in deciding whether or not to continue these time and labor intensive PWC conversions and DBOF consolidations for the transportation function, when the studies required by COBRA Chapter 20 may result in that function being taken over by GSA or a contractor.

6. Lack of manpower and money to complete studies

Budget cuts within the DoD have made it difficult for many organizations to fulfill their primary mission requirements. The COBRA cost studies promise to be time and labor intensive. Devising a means to satisfy organizational mission requirements and the law is the greatest challenge COBRA presents to the Navy. This study was carried out to help the Navy respond to that challenge.

B. THE QUESTIONS AND PROBLEMS ADDRESSED

The DoN has sought guidance from DoD about how to deal with the problems discussed in Section A [Ref 5]. In turn DoD has raised the issues with OMB. Consequently, some of the issues have been resolved. The most problematic ones have not, however [Ref. 6].

NAVFAC has protested the fact that COBRA allows GSA to designate "special purpose" vehicles to be excluded from the studies [Ref. 4]. No response to this protest has been received nor any clarification provided as to what types of vehicles will be so designated.

No real lenience has been offered with regard to previously completed, or currently underway, CA studies. If the outcome of a CA study was that transportation had been kept in-house, in-house transportation costs would have to be compared again to the private sector and, now, also to GSA. If, as a result of a CA study, the transportation function was now provided by a contractor, at the expiration of the contract the COBRA cost studies would have to be done. Similarly, activities in the process of completing a CA study were, and still are, faced with the possible prospect of completing that study only to be tasked to complete another more complex study, just on transportation. [Ref. 7]

The question of what kind of study COBRA requires appears to be effectively answered. Draft OMB guidance has been issued in this regard [Ref. 8]. The intent apparently is to use the same format as applies to CA studies, i.e., a bidding process pitting any in-house organization against GSA and civilian contractors. This guidance has, however, yet to be finalized.

DoD has likewise forwarded to the services a Cost Comparison Handbook in response to the issue of "leveling the

playing field" [Ref. 9]. This handbook was developed by a consultant working for GSA. Its guidance has not completely satisfied DoN on this issue but, at this point, appears to be the final word on the question.

The complications presented by trying to satisfy the requirements of COBRA with a scarcity of people and money while, at the same time, staying on track with PWC consolidations and DBOF conversions have not, and are not expected to be addressed. Because of these problems DoN has made little progress in complying with COBRA.

Unfortunately for DoN, its lack of action has not gone unnoticed by Congress. The Fiscal Year 1991 DoD authorization bill cut the Navy's non-tactical vehicle operating and maintenance budget by $10 million. The House Armed Services Committee justified this cut by saying:

> The committee does not believe the services, except for the Army, have taken steps to reduce vehicle operating costs by considering alternative means for acquiring, operating, and maintaining their fleets. The committee believes immediate action by the military services is needed to study means for reducing their overall vehicle costs. To ensure that this issue receives prompt management attention, the committee recommends reducing the services' O&M authorization request for non-tactical vehicles by $26 million....[Ref. 10]

The report goes on to set the Navy's share of this cut at $10 million.

A combination of the budget cut and the clarification on what type of studies are required by COBRA has prompted the Navy to begin considering in more detail the possible

strategies they might pursue to comply with COBRA. The next section discusses the strategies considered and how this study was undertaken in an attempt to help determine what the best approach may be.

C. ALTERNATIVES FOR COMPLETING THE COBRA STUDIES

When the researcher began study of this issue, he was presented with a point paper prepared by the NAVFAC Transportation Director that outlined several strategies that had been considered for completing the COBRA studies [Ref. 11]. In order of descending cost and ascending desirability these are:

1. Study activities and solicit bids for them individually.
2. Study activities individually but solicit bids for groups of activities. Activities might be grouped by function, sixe region, claimant, etc.
3. Study and solicit bids on a sample of activities. Again these activities might be grouped by a variety of characteristics. Based on the results of the bidding on the sample activities, the entire category of activities would either remain in-house or be converted to a GSA or contractor supported activity.

In studying these alternatives the researcher came to the conclusion that the highest priority should be given to determining whether using a sampling strategy, as described in alternative three above, is feasible. This alternative clearly would be the most cost effective and least time consuming way to comply with the COBRA requirements.

Accordingly, answering that question became the focus of this thesis. The following section discusses in general terms the approach used to determine the feasibility of using a sampling technique.

D. DETERMINING THE FEASIBILITY OF USING SAMPLING

For sampling to be a justifiable technique there needs to be some assurance that the results of a bidding process at the sample activities would be the same as those that would be achieved if the other activities in the group were competed individually. Though contractor bid amounts cannot be reliably predicted, GSA rental rates for all the vehicles they provide are matters of public record [Ref. 12]. A GSA representative stated in a phone conversation with the researcher that their published rates could be used to give a good idea of what GSA's bid would be for a group of vehicles [Ref 13]. Assuming, as NAVFAC is doing, that GSA is the real competition, it would be expected that activities that have very similar costs of providing administrative vehicle fleet management would fare much the same in the bidding process [Ref. 11]. If, then, Naval activities can be divided into categories based on their cost of providing administrative vehicle fleet management, the COBRA cost studies could be accomplished in these categories by using a sampling technique. The researcher focussed most of his efforts on

ascertaining the relative similarity, or lack thereof, of Naval activity fleet management costs.

A brief elaboration on what the researcher means by "fleet management costs" is appropriate here. First, it is important to note that only a similarity in some sort of unit cost can imply the sort of comparability searched for in this study. Two activities, with vehicle fleets composed of very different types of vehicles could, by coincidence, have very similar bottom line costs of providing their fleets. Unless their unit costs of providing the fleets are very similar, though, it would not be expected that they would be similarly competitive with GSA. The particular unit cost the researcher used to compare activities was dollars per type of vehicle per mile driven.

Second, it must be pointed out that only fuel, parts, and direct labor, were deemed to be relevant to the question addressed. Procurement costs, and disposal costs were assumed to be similar between activities and therefore irrelevant to the question of similarity. Since all Naval vehicles are procured and disposed of by CESO and DRMO, respectively, this was felt to be a reasonable assumption. Indirect costs, such as supervisory and administrative expenses, were throughout the data collection period assumed to be similar between activities and also irrelevant to the question addressed by this study. After the data analysis was complete this

assumption was reconsidered. The researcher's conclusions about this matter are addressed in Chapter VI.

III. RESEARCH METHODOLOGY

To proceed with the study the researcher had to decide on three major issues. What activities should be studied? What information should be gathered to allow calculation of the desired cost per type of vehicle per mile driven ? And, what other information, besides cost data, should be gathered about the activities? Section A, B, and C of this Chapter record how the researcher addressed these three questions. Section D describes the data gathering process.

A. WHAT ACTIVITIES SHOULD BE STUDIED?

Inasmuch as the purpose of the study would be to discover if it is possible to categorize Naval activities by their vehicle fleet management costs, it seemed reasonable to first divide them by some other broad characteristics that might have some affect on transportation costs. The characteristics used to make these divisions were largely determined by what summary information was already available.

The summary database the researcher found to contain the most relevant data in this regard is called the Shore Civil Engineering Support Equipment (CESE) Allowance Summary [Ref. 14]. This database is maintained by CESO as a part of the Construction, Automotive and Specialization Equipment

Management Information System (CASEMIS). It separates activities by claimant and reports on the size of their vehicle fleets as well as the general composition of the fleets.

Given the available information, the researcher decided to initially group activities by four characteristics: function (e.g., Air Stations, Shipyards, Subases, etc.), region, vehicle fleet size, and vehicle fleet composition (i.e., percentage of fleet that is sedans, small trucks, heavy trucks, etc.). It was felt that, once activities were divided by function, it would be quite easy to choose out of this category activities of different fleet sizes located in different regions. At that point it remained to be seen how the fleet compositions would compare between different activities.

The researcher recognized that it would be impossible to study activities from every functional category. To study a representative sample of activities from among every type of activity would have been well beyond the scope of this study. Accordingly, the researcher focussed on functional categories of groups having either a large number of activities or a large number of vehicles (i.e., a large fleet size per activity).

Appendix A is the original spreadsheet developed for the purpose of categorizing activities. The activities included in this Table own approximately 73% of the vehicles relevant

to the requirements of COBRA. This Table summarizes the fleet composition information contained in the CASEMIS report. The fleets of each activity are broken down into four broad categories of vehicle type: 01 vehicles (sedans, busses, and station wagons), 02 vehicles (ambulances, vans, and work trucks), 03 vehicles (pickup trucks, larger vans), and 04 vehicles (large trucks). The percentage of the fleet represented by each of these categories was calculated for each activity. The average and standard deviation of these percentages were calculated for each functional category of activity to give a general indication of the typical fleet composition within that category of activity. In comparing the fleet compositions within types of activities, it appeared clear that, in general, fleet composition was closely related to activity function.

With the information in Appendix A, the researcher developed a process to choose the individual activities that would be studied. It was deemed desirable to make comparisons between two activities that were very similar in all but one of the four broad characteristics described above. For example, a comparison might be made between two activities with the same function, similar fleet size, and similar fleet composition, but located in different regions. The notion is, of course, that several comparisons of that type might give evidence that transportation costs either are or are not dependent upon location. Similar comparisons could be made to

isolate activity function, vehicle fleet size, or fleet composition. Throughout the remainder of this thesis, comparisons will be referred to according to the characteristic they seek to isolate (e.g., a comparison made that isolates fleet size will be referred to as a fleet size comparison).

An intensive review of the spreadsheet reproduced in Appendix A resulted in the identification of 85 different activities that might be used to make at least one comparison of the type described above. The researcher felt that no more than 30 activities could be looked at for this study, so a process of paring down this list of activities was initiated.

It was recognized from the list that the candidate activities for comparisons isolating region, fleet size, and function were much more readily available than for comparisons isolating fleet composition. This came as no surprise. To make a comparison isolating fleet composition as the dissimilar characteristic meant comparing two activities of the same type, with similar fleet sizes, and in the same region, but with different fleet compositions. As mentioned previously, fleet composition was generally found to be quite consistent within functional categories. It was then much more difficult to identify candidates for such comparisons.

In consideration of the above, the first activities eliminated were those useful for only one comparison, unless that one comparison was a fleet composition comparison. This

reduced the number of activities to a more manageable size. From this point, the activity selection process was a matter of attempting to include representative samples of a number of functional groups, all major regions of the country, a wide range of fleet sizes, and Navy Industrial Fund activities. The end result of this process was a list of 27 activities. Represented by this list were 10 different types of activity, every different region of the country, and every different range of fleet sizes. With the activities identified the next step was to gather the data needed to make the planned comparisons.

B. FINDING COST DATA

Identifying the most likely source for the cost data needed for this study was not difficult. The researcher was informed that both the Navy Comptroller Manual and the NAVFAC P-300 require the Transportation Director at Naval activities to prepare annually and submit to NAVFAC a Transportation Cost Report (TCR). Figure 1 is a list of the data contained in an activity's TCR. Included in these reports is precisely the information needed (mileage, fuel dollars, labor dollars, and material dollars within each vehicle category group) to

* Cost account code for each Alpha code category of vehicle.

* The average number of vehicles in inventory within each Alpha code.

* The number of downtime hours within each Alpha code.

* The number of miles driven within each Alpha code.

* The number of civilian and military man-hours expended maintaining each Alpha code.

* The amount of wages paid to military and civilian employees directly traceable to each Alpha code.

* The dollar amount spent for parts and other materials for each Alpha code.

* The amount paid to commercial sources for any maintenance received within each Alpha code.

* The number of gallons of fuel used in each Alpha code.

* The dollar amount spent for fuel in each Alpha code.

Data Included in the Transportation Cost Report
Figure 1

compute the unit cost figures desired. The researcher was advised that, though for the study being undertaken the TCR would be the best source of data, the information in the TCR's was often of doubtful quality [Ref. 15].

C. DETERMINING WHAT OTHER DATA SHOULD BE GATHERED AND HOW TO GATHER THEM

It was recognized that there were factors that might influence an activity's transportation costs other than type of activity, size of fleet, composition of fleet, and activity location. To try to identify the most important of these factors the researcher questioned several long-time Navy transportation workers [Ref. 15, 16, 17, 18]. Two other potentially relevant factors identified in these conversations were fleet age and vehicle assignments (i.e., whether vehicles at a given activity are predominantly assigned to an organization or are predominantly motor pool vehicles). Other factors the researcher was curious about in this regard were the number of mechanics at each activity and their wage grades, the number of managerial and administrative personnel at each activity and their wage grades, the extent to which each activity had kept up with the desired preventative maintenance schedule, and the cost of living in the area of each activity. The remainder of this section explains why

each of these factors might affect an activity's transportation costs and discusses the steps taken to gather information on them.

1. Fleet Age

Certainly one would expect that older vehicles would be more costly to maintain than new vehicles. A body of information important to this study then was the vehicle fleet ages at the activities to be studied. The researcher was informed that a CASEMIS data base had records on the model year of all Naval activities' vehicles. A sample of the CASEMIS report is presented in Appendix B. It shows the number of vehicles within in each Alpha code category sharing a model year. The average age of Alpha codes "A" - "N" is also given.

2. Vehicle Assignment

There are three assignment classes for Navy vehicles. A vehicle with an "A" assignment is assigned to an individual, or a particular position. NAVFAC discourages classifying vehicles this way. Typically the vehicle assigned to an activity's Commanding Officer is the only vehicle with a class "A" assignment. Class "B" assignments are vehicles assigned to an organization. Class "C" assignments are vehicles that are operated out of the activity's motor pool. These vehicles are dispatched upon request and returned by the user when the specific trip for which they were requested is completed. It

is generally felt that vehicles assigned to the motor pool are used more efficiently than those assigned to individuals or organizations. A common comment made to the researcher by the transportation directors at various activities was that it was difficult to get organizations to bring their vehicles in for servicing. Both of these factors imply that activities with greater proportions of their vehicles assigned to the motor pool may in the long run, due to less frequent major breakdowns of these vehicles, spend less per vehicle per mile driven than activities with predominantly Class "B" assigned vehicles.

No centralized records of Naval activities' vehicle assignments are maintained. This information was available only from each activity. The researcher included a question about vehicle assignments when interviewing the transportation directors of each activity studied. The interview process is discussed in Section D.

3. Number and wage grades of transportation employees

The researcher's initial inclination was to think that activities with relatively senior personnel in their transportation organizations would tend to have higher relative costs. After further consideration it was recognized that the superior experience and expertise of more senior people could well make such organizations more cost

effective. Either way, this factor seemed to be relevant and therefore worth examining.

The original list of interview questions generated by the researcher included a question regarding the number and wage grades of all transportation personnel. Subsequently, though, the researcher was advised that inquiring about the wage grades in the work force might be considered sensitive information by the transportation directors [Ref. 19]. Accordingly, the original question was revised and only the number of mechanics, administrative workers, and supervisors was inquired about.

4. Preventative Maintenance

Like seniority of personnel, it was not clear precisely how an activity's level of attention to preventative maintenance would affect its overall transportation costs in any one year. Activities with younger fleets might be able to neglect preventative maintenance without seeing an immediate increase in breakdowns. Obviously such neglect cannot continue for long without a corresponding increase in repair costs. A question about each activity's level of attention to preventative maintenance was posed to the transportation directors in order to see if any pattern emerged related to this factor.

5. Cost of operating

Activities in areas with high costs of living should tend to have higher fuel, labor, and material costs. Logically this should translate into higher relative transportation costs. To try to assess the area cost of living for each activity, Consumer Price Index (CPI) figures published by the Bureau of Labor Statistics were examined. Both an overall CPI figure and a CPI figure measuring just regional differences in gasoline prices were obtained. These figures, along with fuel and labor unit costs calculated from the TCR's, were used to assign a cost of operating category of "High", "Medium", or "Low" for each activity. A summary of these cost of living figures, and the cost of operating category assigned to each activity, is presented in Appendix C.

D. GATHERING THE DATA

The most important information from each activity for this study was the cost data contained on the TCR's. Absent cost data, any other information was useless. Before making the effort to gather the subsidiary data, the researcher felt it was wise to confirm that a TCR was available on each activity chosen to be studied. It was quickly discovered that these reports were not always readily available.

The researcher forwarded the list of activities chosen by the process described in Section A of this chapter to NAVFAC,

requesting that a copy of each activity's TCR be provided. The response from NAVFAC was that only approximately one half of the activities on the researcher's list had submitted a TCR for Fiscal Year (FY) '92. The researcher then chose substitute activities, maintaining the goal of studying a group of activities that represented a wide range of functions, fleet sizes, and locales. The result of the second request for TCR's, and of several subsequent requests, was much the same as that of the first request. Of the activities requested each time, typically only one half of them were found to have submitted TCR's in FY '92.

After several rounds of this, it was determined that it would no longer be possible to receive TCR's on activities with the desired broad range of characteristics. It was noted, however, that of the Naval Air Stations on the original list of activities to be studied, over 80% had submitted a TCR in FY '92. At that point the decision was made to focus the study heavily on Naval Air Stations. The lack of availability of TCR's also made it impossible to select activities to be studied such that a significant number of "head to head" comparisons that isolated various characteristics, as had been planned, could be made.

Though this represented a reduction in the scope of the study, it was felt that studying mainly Naval Air Stations could still be quite meaningful. Naval Air Stations are one of the more numerous types of activities in the Navy.

Comparisons of several Naval Air Stations having differences in some of the characteristics being investigated, it was felt, could yield some strong implications about the feasibility of using a sampling procedure to complete the COBRA studies, both among Naval Air Stations and possibly across a broader range of Naval Activities. Accordingly a few more Naval Air Stations were chosen, such that a wide range of fleet sizes and regions were represented by the list of Naval Air Stations to be studied. Thus, the final list of activities was generated. A number of other activities were also studied to see if any clear differences might exist between Naval Air Stations and other types of activities. Figure 2 presents the final list of activities.

NAVFAC provided TCR's for each activity. The main data gathering effort was in contacting and interviewing the transportation director at each activity. Appendix D is a list of the interviews conducted.

NAS GLENVIEW
NAS LEMOORE
NAWC WARMINSTER
SUBASE NEW LONDON
NAVSTA NEW YORK
NAVWPNSTA CHARLESTON
NAS CORPUS CHRISTI
NAS MERIDIAN
NAS OCEANA
NAWC LAKEHURST
NAS ADAK
NAVWPNSTA CONCORD
NAS SOUTH WEYMOUTH
NAS JACKSONVILLE
NAS BRUNSWICK
NAS ATLANTA
NAVAL SHIPYARD LONG BEACH
NAVWPNSTA POINT MUGU
CBC PORT HUENEME
NSWC DAHLGREN
NSWC BETHESDA

Final List of Activities
Figure 2

IV. PRESENTATION OF DATA

The data gathered for this study were compiled and analyzed in several different formats in an attempt to discover any trends that might exist in the transportation costs of Naval Air Stations. The tables in this chapter, as discussed in the following paragraphs, show the various formats in which the data were compiled for analysis. The text of this chapter states some of the general observations made about the data in each of the ways in which it was arranged. Chapter V will discuss in more detail the data analysis process.

The reader will note that the data tables do not include information on all the activities listed in the preceding chapter. An explanation of that fact is in order at this point.

The omitted activities are: Naval Station New York, Construction Battalion Center Port Hueneme, Naval Weapons Station Pt. Mugu, Naval Shipyard Long Beach, and Naval Weapons Station Concord. After gathering data on these activities, it was determined that, in each case, it was either impossible or inappropriate for the purposes of this study to compare them with the other activities being analyzed.

The TCR's of New York and Port Hueneme contained obvious errors. In discussions with the transportation directors at these two activities, the researcher was unable to satisfactorily resolve the discrepancies. Pt. Mugu and Long Beach had obtained the majority of their vehicle maintenance from commercial sources in FY '92. Since the purpose of this study was to determine the comparability of the Navy's in-house transportation costs, the costs at these two activities were irrelevant for further analysis. Concord had received maintenance on its vehicle fleet from PWC San Francisco in FY '92. The researcher was informed that the cost information on these vehicles was not compiled in separate categories for each Alpha Code category. The cost information for Concord was, then, deemed to be useless for the purposes of this study.

In addition to explaining the omission of these activities, it is necessary for the researcher to make some special comments about NAS Brunswick. The mileage figures reported on Brunswick's TCR were, in several categories, far above what might be considered normal readings. The transportation director at Brunswick acknowledged that the mileage shown for Alpha codes I and J were wrong [Ref. 20]. The figures for Alpha codes A, G, and H , though, he felt were reasonable. So high are the mileage figures shown for codes I and J, though, that the overall cost per mile figures for Brunswick's fleet are significantly weighted by these two

categories. The researcher opted to include data on Brunswick in the data tables. In the data analysis, however, the researcher did not compare Brunswick's total unit cost or its costs in categories I and J to other activities.

Omitting the activities mentioned above represented only a minor limitation in the revised scope of this study. As discussed in Chapter III, the lack of cost information on activities other than Naval Air Stations had already shifted the primary focus of this study to analyzing and comparing the transportation costs at Naval Air Stations. Since none of the activities completely omitted were Naval Air Stations, the main thrust of the efforts reported on here was unaffected by the exclusion of these other activities. Reducing the number of non-Naval Air Station activities did, though, make it even more unlikely that any "Navy-wide" conclusions could be drawn as a result of this study. The data found useful for this study are discussed in general in the following sections.

A. INDIVIDUAL ACTIVITY DATA BASES

As discussed in the preceding chapter, the data came from a variety of reports and publications from, and telephone interviews with, several different organizations. The researcher compiled a substantial library of information on each activity. The first logical step was deemed to be designing a single table, to present in a condensed format all

of the potentially relevant information on each activity. Appendix E presents these data in the format developed.

The top line of each of these reports gives summary information that is, with the exception of the total dollars per mile figure, primarily demographic in nature. The indication given for the extent to which each activity was on schedule with preventative maintenance servicing during FY '92 (the "Doing PM's " column) is a general, not absolute, indicator. The figures in the fuel cost per gallon and average labor rate columns are calculated from the fuel gallons, fuel dollars, labor hours, and labor dollars (wages and fringes) values on each activity's TCR. These figures were found to be reasonably consistent with the other cost of living information collected (see Appendix C). The total dollars per mile column is the total unit cost for all administrative vehicles (Alpha codes A-N) at the activity as calculated from the TCR information.

The body of each report presents, with the exception of the average model year column, values calculated from the information given in each activity's TCR. The average model year information was received from CESO (see Appendix B). The "DT/KMI" column, gives the number of downtime hours per thousand miles driven within each Alpha code for the year.

Though useful for reference during the analysis process, these tables contained too much information to be extremely valuable, in and of themselves, in identifying any patterns

present in the overall data. The researcher found it necessary, then, to arrange different parts of the data to allow side by side comparisons of various aspects of each activity's data. The next section discusses some of the tables developed in that regard.

B. GROUP DATA BASES

In developing the tables displaying cost data on each activity's fleet by Alpha code, it was decided to include only the categories of vehicles owned by almost all of the activities. The categories omitted were not represented in the fleets of several activities and represented only a small proportion of the fleets studied.

Almost all activities owned vehicles from Alpha code categories A (sedans), B (busses), E (station wagons), G (cargo pickup trucks), H (utility trucks, larger pickup trucks), I (vans), K (dump trucks, large vans), and M (tractor trailers, stake trucks). Some activities also owned vehicles from Alpha code categories D (intercity busses), F (ambulances), J (specialty trucks, and N (very large trucks). The vehicles in the latter categories, though, represent less than 3% of the total vehicle fleets at the Naval Air Stations studied, and most Naval Air Stations had no vehicles in these categories. It was felt that including these more rare Alpha codes in the category-by-category analyses could not have contributed to any conclusions. Still, it was recognized that

these Alpha codes may have incurred enough costs to influence the analysis of more comprehensive unit cost figures. Therefore, the costs for these categories were included when calculating comprehensive "total cost per mile" figures at each activity. The remainder of the paragraphs in this section discuss the group data bases developed.

1. Cost per mile tables

Tables 1 through 3, respectively, show the FY '92 fuel, labor, and material (parts) costs per mile within each Alpha code group at each activity. Table 4 shows the total dollar per mile figure within each category at every activity.

A cursory comparison of the standard deviations and averages within each category immediately shows that, in general, the data are widely dispersed. Examination of each value in each category in some cases shows that most of the numbers are grouped in a fairly tight range but that two or three outlying values skew the average and deviation. In other cases no pattern is discernible. The other general observations made about these tables is that fuel cost figures are more consistent than the other cost inputs (material and labor), the more heavily populated Alpha codes (G and H) have a noticeably narrower range of values, and, overall, the non-Naval Air Station activities seem to have tighter data groupings.

TABLE 1

FUEL DOLLARS PER VEHICLE MILE

ALPHA CODE	A	B	E	G	H	I	K	M
ACTIVITY								
NSWC DAHLGREN	$0.03	$0.08	$0.10	$0.05	$0.05	$0.09	$0.05	$0.06
NSWC BETHESDA	$0.04	$0.11	$0.03	$0.05	$0.08	$0.11	$0.09	$0.10
SUBBASE NEW LONDON	$0.04	$0.11	$0.02	$0.05	$0.07	$0.13	----	----
WPNSTA CHARLESTON	$0.01	$0.07	----	$0.04	$0.04	$0.06	$0.13	$0.09
NAWC WARMINSTER	$0.06	$0.08	$0.06	$0.08	$0.06	$0.13	$0.05	$0.07
NAWC LAKEHURST	$0.01	$0.20	$0.03	$0.07	$0.06	$0.13	$0.11	$0.05
AVERAGE	$0.03	$0.11	$0.05	$0.05	$0.06	$0.11	$0.09	$0.07
STANDARD DEVIATION	$0.02	$0.04	$0.03	$0.01	$0.01	$0.03	$0.03	$0.02
NAS CORPUS CHRISTI	$0.05	$0.54	$0.03	$0.07	$0.06	$0.06	$0.10	$0.09
NAS BRUNSWICK	$0.10	$0.04	$0.06	$0.01	$0.03	$0.01	$0.01	$0.05
NAS OCEANA	$0.05	$0.08	$0.05	$0.08	$0.11	$0.17	$0.05	$0.05
NAS GLENVIEW	$0.12	$0.21	$0.06	$0.05	$0.05	$0.13	----	$0.05
NAS LEMOORE	$0.06	$0.13	$0.04	$0.05	$0.04	$0.13	$0.18	$0.05
NAS SOUTH WEYMOUTH	$0.05	$0.13	$0.03	$0.06	$0.06	$0.12	$0.06	$0.11
NAS JAX	$0.04	$0.09	$0.04	$0.06	$0.06	$0.05	$0.08	$0.07
NAS ADAK	$0.03	$0.04	----	$0.04	$0.07	$0.07	$0.04	$0.11
NAS MERIDIAN	$0.03	$0.09	----	$0.05	$0.07	$0.11	$0.12	$0.42
AVG FOR NAS'	$0.06	$0.15	$0.05	$0.05	$0.06	$0.09	$0.08	$0.11
STD DEV FOR NAS'	$0.03	$0.15	$0.02	$0.02	$0.02	$0.05	$0.05	$0.11
AVG FOR ALL	$0.05	$0.13	$0.05	$0.05	$0.06	$0.10	$0.08	$0.10
STD DEV FOR ALL	$0.03	$0.12	$0.02	$0.01	$0.02	$0.04	$0.04	$0.09

ALPHA CODE A = SEDANS ALPHA CODE B = BUSSES ALPHA CODE E = STATION WAGONS ALPHA CODE G = CARGO PICKUPS
ALPHA CODE H = UTILITY TRUCKS, LARGER PICKUP TRUCKS ALPHA CODE I = VANS ALPHA CODE K = DUMPS, LARGE VANS
ALPHA CODE M = TRACTOR TRAILERS

TABLE 2

LABOR DOLLARS PER VEHICLE MILE

ALPHA CODE	A	B	E	G	H	I	K	M
ACTIVITY								
NSWC DAHLGREN	$0.05	$0.25	$0.04	$0.07	$0.06	$0.18	$0.14	$0.19
NSWC BETHESDA	$0.14	$0.22	$0.06	$0.09	$0.11	$0.07	$0.03	$0.12
SUBBASE NEW LONDON	$0.02	$0.05	$0.02	$0.10	$0.12	$0.04	----	----
WPNSTA CHARLESTON	$0.05	$0.32	----	$0.03	$0.06	$0.06	$0.27	$0.19
NAWC WARMINSTER	$0.06	$0.18	$0.05	$0.07	$0.04	$0.19	$0.06	$0.47
NAWC LAKEHURST	$0.06	$0.21	$0.11	$0.06	$0.07	$0.11	$0.24	$0.17
AVERAGE	$0.06	$0.21	$0.06	$0.07	$0.08	$0.11	$0.15	$0.23
STANDARD DEVIATION	$0.04	$0.08	$0.03	$0.02	$0.03	$0.06	$0.09	$0.12
NAS CORPUS CHRISTI	$0.09	$2.80	$0.21	$0.11	$0.16	$0.09	$0.25	$0.64
NAS BRUNSWICK	$0.01	$0.26	$0.12	$0.03	$0.03	$0.02	$0.11	$0.09
NAS OCEANA	$0.07	$0.14	$0.03	$0.09	$0.11	$0.16	$0.05	$0.25
NAS GLENVIEW	$0.34	$0.17	$0.03	$0.03	$0.08	$0.55	-----	$0.06
NAS LEMOORE	$0.06	$0.05	$0.02	$0.04	$0.03	$0.10	$0.27	$0.04
NAS SOUTH WEYMOUTH	$0.05	$0.25	$0.08	$0.09	$0.07	$0.62	$0.13	$0.24
NAS JAX	$0.11	$0.24	$0.07	$0.08	$0.09	$0.11	$0.07	$0.14
NAS ADAK	$0.06	$0.03	-----	$0.06	$0.05	$0.16	$0.13	$0.33
NAS MERIDIAN	$0.02	$0.07	----	$0.07	$0.09	$0.17	$0.28	$0.41
AVG FOR NAS'	$0.09	$0.45	$0.08	$0.07	$0.08	$0.22	$0.16	$0.24
STD DEV FOR NAS'	$0.09	$0.84	$0.06	$0.03	$0.04	$0.20	$0.09	$0.18
AVG FOR ALL	$0.08	$0.35	$0.07	$0.07	$0.08	$0.18	$0.16	$0.24
STD DEV FOR ALL	$0.08	$0.66	$0.05	$0.03	$0.04	$0.17	$0.09	$0.16

ALPHA CODE A = SEDANS ALPHA CODE B = BUSSES ALPHA CODE E = STATION WAGONS ALPHA CODE G = CARGO PICKUPS
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ALPHA CODE M = TRACTOR TRAILERS

TABLE 3

MATERIAL DOLLARS PER VEHICLE MILE

ALPHA CODE	A	B	E	G	H	I	K	M
ACTIVITY								
NSWC DAHLGREN	$0.02	$0.08	$0.02	$0.04	$0.03	$0.10	$0.06	$0.13
NSWC BETHESDA	$0.06	$0.65	$0.06	$0.06	$0.06	$0.03	$0.01	$0.13
SUBBASE NEW LONDON	$0.03	$0.15	$0.03	$0.03	$0.04	$0.06	----	----
WPNSTA CHARLESTON	$0.04	$0.32	----	$0.03	$0.05	$0.06	$0.26	$0.23
NAWC WARMINSTER	$0.05	$0.18	$0.04	$0.09	$0.02	$0.06	$0.04	$0.72
NAWC LAKEHURST	$0.06	$0.05	$0.05	$0.05	$0.06	$0.09	$0.06	$0.26
AVERAGE	$0.04	$0.24	$0.25	$0.05	$0.04	$0.07	$0.09	$0.29
STANDARD DEVIATION	$0.01	$0.20	$0.23	$0.02	$0.01	$0.02	$0.10	$0.22
NAS CORPUS CHRISTI	$0.02	$0.48	$0.05	$0.04	$0.03	$0.04	$0.05	$0.28
NAS BRUNSWICK	$0.00	$0.20	$0.06	$0.02	$0.01	$0.01	$0.04	$0.04
NAS OCEANA	$0.02	$0.11	$0.02	$0.01	$0.02	$0.09	$0.02	$0.15
NAS GLENVIEW	$0.05	$0.06	$0.04	$0.06	$0.10	$0.04	----	$0.04
NAS LEMOORE	$0.07	$0.03	$0.01	$0.02	$0.02	$0.07	$0.16	$0.01
NAS SOUTH WEYMOUTH	$0.02	$0.09	$0.00	$0.02	$0.04	$0.24	$0.05	$0.14
NAS JAX	$0.06	$0.06	$0.04	$0.03	$0.03	$0.04	$0.06	$0.05
NAS ADAK	$0.01	$0.03	----	$0.03	$0.03	$0.06	$0.06	$0.12
NAS MERIDIAN	$0.00	$0.01	----	$0.02	$0.02	$0.06	$0.06	$0.30
AVG FOR NAS'	$0.03	$0.12	$0.03	$0.03	$0.03	$0.07	$0.07	$0.13
STD DEV FOR NAS'	$0.02	$0.13	$0.02	$0.01	$0.02	$0.06	$0.04	$0.10
AVG FOR ALL	$0.03	$0.17	$0.16	$0.04	$0.04	$0.07	$0.08	$0.19
STD DEV FOR ALL	$0.02	$0.17	$0.19	$0.02	$0.02	$0.05	$0.07	$0.17

ALPHA CODE A = SEDANS ALPHA CODE B = BUSSES ALPHA CODE E = STATION WAGONS ALPHA CODE G = CARGO PICKUPS
ALPHA CODE H = UTILITY TRUCKS, LARGER PICKUP TRUCKS ALPHA CODE I = VANS ALPHA CODE K = DUMPS, LARGE VANS
ALPHA CODE M = TRACTOR TRAILERS

TABLE 4

TOTAL DOLLARS PER VEHICLE MILE

ALPHA CODE	A	B	E	G	H	I	K	M
ACTIVITY								
NSWC DAHLGREN	$0.10	$0.41	$0.16	$0.17	$0.14	$0.38	$0.25	$0.38
NSWC BETHESDA	$0.24	$0.98	$0.17	$0.23	$0.24	$0.21	$0.12	$0.35
SUBBASE NEW LONDON	$0.09	$0.31	$0.08	$0.18	$0.23	$0.23	----	----
WPNSTA CHARLESTON	$0.10	$0.72	----	$0.11	$0.15	$0.17	$0.69	$0.51
NAWC WARMINSTER	$0.17	$0.45	$0.15	$0.22	$0.13	$0.40	$0.16	$1.26
NAWC LAKEHURST	$0.13	$0.47	$0.19	$0.19	$0.20	$0.33	$0.43	$0.48
AVERAGE	$0.14	$0.56	$0.15	$0.18	$0.18	$0.29	$0.28	$0.50
STANDARD DEVIATION	$0.05	$0.23	$0.04	$0.04	$0.04	$0.09	$0.21	$0.34
NAS CORPUS CHRISTI	$0.16	$3.60	$0.29	$0.22	$0.25	$0.19	$0.39	$1.01
NAS BRUNSWICK	$0.11	$0.50	$0.25	$0.07	$0.07	$0.03	$0.16	$0.18
NAS OCEANA	$0.14	$0.34	$0.09	$0.15	$0.25	$0.43	$0.12	$0.44
NAS GLENVIEW	$0.50	$0.46	$0.15	$0.14	$0.23	$0.72	----	$0.15
NAS LEMOORE	$0.19	$0.21	$0.07	$0.14	$0.11	$0.38	$0.61	$0.10
NAS SOUTH WEYMOUTH	$0.12	$0.47	$0.11	$0.17	$0.17	$0.98	$0.24	$0.14
NAS JAX	$0.21	$0.39	$0.16	$0.17	$0.19	$0.20	$0.22	$0.26
NAS ADAK	$0.09	$0.11	----	$0.12	$0.15	$0.31	$0.23	$0.56
NAS MERIDIAN	$0.08	$0.18	----	$0.14	$0.18	$0.34	$0.46	$1.13
AVG FOR NAS'	$0.18	$0.72	$0.16	$0.15	$0.18	$0.40	$0.30	$0.44
STD DEV FOR NAS'	$0.12	$1.10	$0.08	$0.04	$0.06	$0.27	$0.16	$0.37
AVG FOR ALL	$0.16	$0.65	$0.16	$0.16	$0.18	$0.35	$0.31	$0.50
STD DEV FOR ALL	$0.10	$0.87	$0.06	$0.04	$0.05	$0.23	$0.18	$0.36

ALPHA CODE A = SEDANS ALPHA CODE B = BUSSES ALPHA CODE E = STATION WAGONS ALPHA CODE G = CARGO PICKUPS
ALPHA CODE H = UTILITY TRUCKS, LARGER PICKUP TRUCKS ALPHA CODE I = VANS ALPHA CODE K = DUMPS, LARGE VANS
ALPHA CODE M = TRACTOR TRAILERS

It was clear to the researcher that, given such dispersal in the financial data, if any patterns existed they must be tied to nonfinancial factors. The next set of tables incorporated some of these factors in the analysis.

2. Financial and nonfinancial factor tables

Tables 5, 6, and 7 display total cost per mile within each category at each activity in relation to each of the following: average model year, downtime per vehicle, and miles per vehicle. Intuitively, one would expect that corresponding to increases in vehicle age and downtime would be increases in cost per mile. Tables 5 and 6, however, do not consistently fulfill that expectation. Conversely, Table 7, for the most part, gives more predictable indications. It shows that cost per mile tends to come down as average miles driven go up.

These data also have aberrations though. Further, though the general indications seem consistent, the magnitudes of the jumps and drops in costs within a category are often inconsistent with the magnitude of the increases and decreases in miles per vehicle.

No definitive conclusions were forthcoming from these tables. The researcher then opted to obtain a more broad financial profile of the activities and analyze this along with some nonfinancial factors.

TABLE 5

AVERAGE MODEL YEAR VERSUS TOTAL COST PER MILE

ALPHA CODE	A		B		E		G		H		I		M	
	$/MI	MOD YR	$/MI	MOD YR	$/MI	MOD YR	$/MI	MOD YR	$/MI	MOD YR	$/MI	MOD YR	$/MI	MOD YR
ACTIVITY														
NSWC DAHLGREN	$0.10	1988	$0.41	1990	$0.16	1988	$0.17	1988	$0.14	1989	$0.38	1988	$0.38	1987
NSWC BETHESDA	$0.24	1985	$0.98	1979	$0.17	1988	$0.23	1987	$0.24	1980	$0.21	1984	$0.35	1983
SUBBASE NEW LONDON	$0.09	1988	$0.31	1988	$0.08	1986	$0.16	1988	$0.23	1985	$0.23	1984	----	----
WPNSTA CHARLESTON	$0.10	1988	$0.72	1988	----	1990	$0.11	1988	$0.15	1988	$0.17	1987	$0.51	1988
NAWC WARMINSTER	$0.17	1985	$0.45	1977	$0.15	1987	$0.22	1987	$0.13	1988	$0.40	1980	$1.26	1974
NAWC LAKEHURST	$0.13	1988	$0.47	1986	$0.19	1986	$0.19	1989	$0.20	1989	$0.33	1987	$0.48	1985
AVERAGE	$0.14	1987	$0.56	1985	$0.15	1987	$0.18	1988	$0.18	1987	$0.29	1985	$0.60	1983
STANDARD DEVIATION	$0.05	1	$0.23	5	$0.04	1	$0.04	1	$0.04	3	$0.09	3	$0.34	5
NAS CORPUS CHRISTI	$0.18	1988	$3.80	1983	$0.29	1986	$0.22	1985	$0.25	1987	$0.19	1984	$1.01	1983
NAS BRUNSWICK	$0.11	1986	$0.50	1987	$0.25	1986	$0.07	1986	$0.07	1987	$0.03	1987	$0.18	1981
NAS GLENVIEW	$0.50	1987	$0.46	1981	$0.15	1986	$0.14	1987	$0.23	1986	$0.72	1983	$0.15	1983
NAS LEMOORE	$0.19	1986	$0.21	1985	$0.07	1987	$0.14	1987	$0.11	1990	$0.38	1985	$0.10	1984
NAS SOUTH WEYMOUTH	$0.12	1988	$0.47	1981	$0.11	1988	$0.17	1987	$0.17	1987	$0.98	1984	$0.14	1983
NAS ADAK	$0.09	1988	$0.11	1985	----	----	$0.12	1984	$0.15	1986	$0.31	1985	$0.58	1982
NAS MERIDIAN	$0.08	1989	$0.18	1989	----	----	$0.14	1989	$0.18	1989	$0.34	1985	$1.13	1984
AVG FOR NAS'	$0.18	1987	$0.82	1984	$0.17	1987	$0.14	1987	$0.17	1987	$0.42	1985	$0.47	1983
STD DEV FOR NAS'	$0.14	1	$1.23	3	$0.08	1	$0.04	2	$0.08	1	$0.30	1	$0.41	1
AVG FOR ALL	$0.16	1987	$0.70	1985	$0.16	1987	$0.16	1987	$0.17	1987	$0.36	1985	$0.52	1983
STD DEV FOR ALL	$0.11	1	$0.92	4	$0.07	1	$0.05	1	$0.05	2	$0.24	2	$0.39	3

TABLE 6

DOWNTIME HOURS PER 1000 MILES DRIVEN VERSUS TOTAL COST PER MILE

ALPHA CODE	A		B		E		G		H		I		M	
	$/MI	DT/KMI	$/MI	DT/KMI	$/MI	DT/KMI	$/MI	DT/KMI	$/MI	DT/KMI	$/MI	DT/KMI	$/MI	DT/KMI
ACTIVITY														
NSWC DAHLGREN	$0.10	38	$0.41	43	$0.16	16	$0.17	6	$0.14	38	$0.38	81	$0.38	159
NSWC BETHESDA	$0.24	15	$0.98	119	$0.17	17	$0.23	23	$0.24	16	$0.21	23	$0.35	20
SUBBASE NEW LONDON	$0.09	20	$0.31	57	$0.08	14	$0.16	24	$0.23	4	$0.23	40	----	----
WPNSTA CHARLESTON	$0.10	38	$0.72	153	----	0	$0.11	32	$0.15	65	$0.17	73	$0.51	99
NAWC WARMINSTER	$0.17	2	$0.45	6	$0.15	3	$0.22	3	$0.13	2	$0.40	10	$1.28	27
NAWC LAKEHURST	$0.13	74	$0.47	984	$0.19	66	$0.19	180	$0.20	120	$0.33	335	$0.48	402
AVERAGE	$0.14	31	$0.56	224	$0.15	23	$0.16	45	$0.16	41	$0.29	90	$0.60	141
STANDARD DEVIATION	$0.05	23	$0.23	334	$0.04	30	$0.04	61	$0.04	42	$0.09	111	$0.34	140
NAS CORPUS CHRISTI	$0.16	91	$3.80	781	$0.29	214	$0.22	53	$0.25	55	$0.19	85	$1.01	884
NAS BRUNSWICK	$0.11	38	$0.50	481	$0.25	316	$0.07	49	$0.07	56	$0.03	16	$0.16	357
NAS OCEANA	$0.14	253	$0.34	105	$0.09	55	$0.15	6	$0.25	66	$0.43	200	$0.44	110
NAS GLENVIEW	$0.50	49	$0.46	116	$0.15	3	$0.14	29	$0.23	107	$0.72	123	$0.15	105
NAS LEMOORE	$0.19	493	$0.21	323	$0.07	60	$0.14	167	$0.11	122	$0.36	567	$0.10	140
NAS SOUTH WEYMOUTH	$0.12	112	$0.47	52	$0.11	53	$0.17	107	$0.17	59	$0.96	127	$0.14	107
NAS JAX	$0.21	127	$0.39	174	$0.16	12	$0.17	90	$0.19	94	$0.20	141	$0.26	173
NAS ADAK	$0.09	50	$0.11	94	----	----	$0.12	121	$0.15	93	$0.31	398	$0.56	992
NAS MERIDIAN	$0.06	3	$0.16	14	----	----	$0.14	19	$0.16	26	$0.34	36	$1.13	77
AVG FOR NAS'	$0.16	135	$0.72	238	$0.16	120	$0.15	71	$0.16	76	$0.40	166	$0.44	327
STD DEV FOR NAS'	$0.12	144	$1.10	236	$0.06	109	$0.04	50	$0.06	29	$0.27	170	$0.37	337
AVG FOR ALL	$0.17	94	$0.65	232	$0.16	72	$0.17	61	$0.16	63	$0.35	149	$0.50	261
STD DEV FOR ALL	$0.10	123	$0.67	260	$0.06	93	$0.04	57	$0.05	39	$0.23	157	$0.36	298

TABLE 7

MILES PER VEHICLE VERSUS TOTAL COST PER MILE

ALPHA CODE	A		B		E		G		H		I		M	
	$/MI	MI/VEH	$/MI	MI/VEH	$/MI	MI/VEH	$/MI	MI/VEH	$/MI	MI/VEH	$/MI	MI/VEH	$/MI	MI/VEH
ACTIVITY														
NSWC DAHLGREN	$0.10	10063	$0.41	3000	$0.16	11000	$0.17	5495	$0.14	6300	$0.38	4690	$0.38	3690
NSWC BETHESDA	$0.24	3667	$0.98	1000	$0.17	10400	$0.23	4240	$0.24	3818	$0.21	4000	$0.35	6800
SUBBASE NEW LONDON	$0.09	8545	$0.31	3800	$0.08	9272	$0.18	5287	$0.23	6786	$0.23	2833	----	----
WPNSTA CHARLESTON	$0.10	18640	$0.72	3500	----	4000	$0.11	6917	$0.15	7248	$0.17	8500	$0.51	3203
NAWC WARMINSTER	$0.17	11200	$0.45	3500	$0.15	7667	$0.22	4818	$0.13	7357	$0.40	1600	$1.26	2333
NAWC LAKEHURST	$0.13	11647	$0.47	1500	$0.19	7000	$0.19	4434	$0.20	5571	$0.33	4667	$0.46	3461
AVERAGE	$0.14	10294	$0.56	2717	$0.15	8223	$0.18	5195	$0.18	6180	$0.29	4362	$0.80	3897
STANDARD DEVIATION	$0.05	3872	$0.23	1073	$0.04	2352	$0.04	884	$0.04	1215	$0.09	2138	$0.34	1522
NAS CORPUS CHRISTI	$0.16	8928	$3.80	500	$0.29	2500	$0.22	1769	$0.25	6892	$0.19	3636	$1.01	245
NAS BRUNSWICK	$0.11	18100	$0.50	3000	$0.25	5000	$0.07	10163	$0.07	15375	$0.03	34792	$0.18	1909
NAS OCEANA	$0.14	3000	$0.34	8286	$0.09	8200	$0.15	7292	$0.25	5211	$0.43	3692	$0.44	3615
NAS GLENVIEW	$0.50	7143	$0.46	4667	$0.15	6000	$0.14	4848	$0.23	4458	$0.72	3917	$0.15	3500
NAS LEMOORE	$0.19	8285	$0.21	11929	$0.07	28000	$0.14	8797	$0.11	13400	$0.38	3250	$0.10	11417
NAS SOUTH WEYMOUTH	$0.12	13090	$0.47	4500	$0.11	6000	$0.17	4892	$0.17	7357	$0.98	1600	$0.14	2881
NAS JAX	$0.21	3400	$0.39	4733	$0.16	5500	$0.17	4779	$0.19	4803	$0.20	4600	$0.26	4167
NAS ADAK	$0.09	5200	$0.11	28056	----	----	$0.12	11667	$0.15	13441	$0.31	7538	$0.56	2333
NAS MERIDIAN	$0.06	9266	$0.16	13500	----	----	$0.14	4261	$0.16	5976	$0.34	6538	$1.13	2111
AVG FOR NAS'	$0.16	8048	$0.72	8797	$0.16	9283	$0.15	6481	$0.18	8524	$0.40	7729	$0.44	3573
STD DEV FOR NAS'	$0.12	4575	$1.10	7871	$0.08	6538	$0.04	3024	$0.06	4048	$0.27	9712	$0.37	2980
AVG FOR ALL	$0.17	8946	$0.65	6365	$0.16	8753	$0.16	5966	$0.18	7586	$0.35	6390	$0.50	3869
STD DEV FOR ALL	$0.10	4446	$0.87	6819	$0.06	6285	$0.04	2489	$0.05	3426	$0.23	7817	$0.36	2581

3. Total cost per mile versus nonfinancial factors

Table 8 shows the total cost per mile of each activity's fleet alongside some nonfinancial characteristics of that activity. Somewhat surprisingly, the total costs per mile are relatively tightly grouped. Given the dispersal in the data within categories, the consistency in this more broad measure is difficult to explain. As with the other data presentations, no clear pattern related to any factor, or combination of factors, emerges to explain the movements of the cost data.

TABLE 8

FINANCIAL AND NONFINANCIAL DATA

ALPHA CODE	TOT/MI ($'S/MI)	MI/VEH	COO	PM's	MY	MAIN ASSIGNMENT	# OF MECHANICS	# OF VEHICLES
ACTIVITY								
NSWC DAHLGREN	$0.18	5706	HIGH	YES	'87	C	10	339
NSWC BETHESDA	$0.24	3288	MED	YES	'84	C	2	104
SUBBASE NEW LONDON	$0.18	3208	MED	NO	'86	B	8	265
WPNSTA CHARLESTON	$0.18	6710	LOW	YES	'87	B	11	634
NAWC WARMINSTER	$0.22	6275	HIGH	YES	'84	C	2	58
NAWC LAKEHURST	$0.21	5209	HIGH	YES	'87	?	5	191
AVERAGE	$0.20	5899			'86			
STANDARD DEVIATION	$0.02	446						
NAS CORPUS CHRISTI	$0.23	2441	LOW	NO	'85	B	8	342
NAS BRUNSWICK	$0.07	15497	MED	NO	'86	B	3	183
NAS OCEANA	$0.25	5844	LOW	YES	----	B	4	199
NAS GLENVIEW	$0.33	4704	HIGH	YES	'85	B	4	74
NAS LEMOORE	$0.13	9584	MED	?	'86	B	7	261
NAS SOUTH WEYMOUTH	$0.21	6546	HIGH	NO	'85	B	5	74
NAS JAX	$0.22	4407	LOW	YES	----	B	8	285
NAS ADAK	$0.15	11863	?	YES	'84	B	4	205
NAS MERIDIAN	$0.21	5239	MED	YES	'86	B	5	139
AVG FOR NAS'	$0.20	7325			'86			
STD DEV FOR NAS'	$0.07	3937						
AVG FOR ALL	$0.20	6755			'86			
STD DEV FOR ALL	$0.06	3147						

#TOT/MI = TOTAL DOLLARS (FUEL, LABOR, AND MATERIALS) PER MILE DRIVEN
#MI/VEH = MILES PER VEHICLE
COO = ACTIVITY RELATIVE COST OF OPERATING
#PM's = IS THE ACTIVITY KEEPING UP, IN GENERAL WITH THE REQUIRED PREVENTATIVE MAINTENANCE ACTIONS ?
#MY = AVERAGE MODEL YEAR OF THE ACTIVITY'S VEHICLES
#MAIN ASSIGNMENT = THE PREDOMINANT CATEGORY OF VEHICLE ASSIGNMENT AT THE ACTIVITY

V. ANALYSIS AND INTERPRETATION

This chapter discusses in detail the data analysis process. Described fully here are the findings of the researcher with regard to the quality of the data collected and the specifics about the comparisons made and analyses done in the search for identifiable trends in Naval activity transportation costs.

A. QUALITY OF THE DATA

The degree of confidence with which conclusions can be drawn from any set of data is heavily influenced by the researcher's assessment of the quality of the data. In a study such as the one reported on by this thesis, where the researcher collects rather than produces the data, an evaluation of the data's quality can be particularly difficult. For a number of reasons, the researcher for this study is skeptical about the reliability of the data collected.

1. Expert opinion

In explaining the planned research methodology for this study to veterans of Naval transportation organizations, the comment was frequently made to the researcher that good cost data may be difficult to get [Ref. 15, 16, 17, 18].

Indeed, when the researcher solicited the advice of the Transportation Equipment Management Centers (TEMC's), the regional Naval vehicle fleet managers, on what activities in their regions consistently provide quality TCR's, only three activities were cited [Ref. 20].

As the data gathering and analysis phases of this study proceeded, the researcher discovered more evidence, both testimonial and material, that supported the opinions of the experts with regard to the quality of the average TCR. The following paragraphs discuss this additional evidence.

2. Activity transportation director comments

In the interviews conducted with the activity transportation directors, the researcher asked the directors about their feelings regarding their activities' TCR's. Though some directors endorsed the use of TCR's and were satisfied with the quality of the data in their reports, many acknowledged that the data in their activities' TCR's may have been inaccurate. The primary concerns expressed that directly related to the quality of the cost information involve the number of people outside the transportation organization who input cost data into the report and problems with the computer systems (equipment and software) used to generate the TCR. In the researcher's opinion, the lack of management endorsement of the TCR implied by some of the other dissatisfactions expressed about it, most notably regarding its lack of

usefulness as a management tool, may also adversely affect the reliability of the report. If some activities are submitting a report just to fulfill a requirement, it is likely that they expend little effort in checking the quality of the data.

3. Failure of activities to submit a TCR

As reported in Section D of Chapter III, the researcher experienced considerable difficulty in obtaining TCR's on the activities originally chosen to be studied. Before the decision was made to focus more heavily on Naval Air Stations than other activities, the researcher found that TCR's had been submitted by only approximately one-half of the activities for which they were requested. The apparent widespread lack of attention to cost reporting requirements by Naval transportation organizations could imply a general absence of time, resources, or desire to accurately account for transportation costs.

4. Apparent discrepancies in the TCR's examined

Almost every TCR examined for this study contained some figures that looked very questionable. Certainly there are valid explanations for some of these aberrations. Section B of this chapter offers some possible explanations for how some of the apparently abnormal figures could, in fact, be accurate. The prevalence of seemingly aberrant figures and the activities' general lack of awareness of and frequent inability to explain them, though, lead the

researcher to conclude that many of the figures that appear to be wrong probably are.

The fuel section of a number of activities' TCR's contained illogical data. Logically, the quotient obtained when the total fuel dollars are divided by the gallons of fuel consumed should be a reasonable figure for dollars per gallon of fuel. Frequently this was not found to be the case. Some of the fuel costs that result from making such calculations from the TCR's are: NAS Lemoore - $1.36/gal, NAVSTA New York - $0.42/gal, WPNSTA Charleston - $16.32/gal, NAS Jacksonville - $0.72/gal, and NSWC Bethesda - $0.68. The directors who were asked about or who volunteered information on the fuel section of their activities' TCR's universally expressed their lack of control over the amounts for gallons consumed and fuel dollars in the TCR. In most cases this information is provided by the activity's fuel farm to the activity's controller. The controller takes this input, along with the labor dollar, material dollar, mileage, downtime, and labor hour information provided by the transportation director, and compiles the TCR. In general, there appears to be no check on the accuracy of the overall report before its submission to NAVFAC and the Navy Comptroller.

Very frequently when the researcher contacted an activity's transportation director to seek clarification on information that appeared to be questionable, the director was surprised to learn of the discrepancy. Rarely did the

director have better data readily available. In one case it took a series of phone calls over a two week period to obtain more reasonable data for three Alpha code categories at a particular activity. In two cases, as mentioned in Chapter III, it was deemed to be unlikely that any data that could reasonably be assumed to be reliable would be obtained. These activities were excluded from further consideration.

This subsection is not intended to question the competence of Navy transportation directors. The scope of this study did not allow any conclusions as to why discrepancies in the TCR data sometimes go unnoticed or uncorrected. Clearly, though, for some reasons, the TCR's frequently are generated -- when they are generated -- with something less than meticulous attention to detail.

5. Lack of consistency between activities

It would have been no surprise to find occasional aberrant figures in different categories of vehicles. Likewise, it would not have been unexpected to find a few activities with costs significantly, and consistently, outside of some "normal" range. The degree of dispersal in the data of this study, though, is considered to be unusually high. The lack of identifiable patterns in the fluctuations is similarly inexplicable. This lack of consistency is more completely discussed in the next section. For the purpose of

this section it is sufficient to observe that the unusually inconsistent data may simply reflect poor data quality.

In consideration of the discussion in this section the reader may legitimately question why the researcher continued to plan the study around an analysis of the TCR's. The answer is threefold. First, the sponsor of this study, NAVFAC, identified the area of research of this study as being the most pressing item of interest to them related to COBRA [Ref. 19]. Second, in spite of the questionable quality of the data, the TCR was acknowledged to be the only source of the type of data needed for the type of study desired [Ref. 16]. Third, it was not clear if the quality problems with the TCR were so great as to completely preclude reaching any meaningful conclusions. The data, then, were analyzed and interpreted objectively. Nothing received was dismissed out of hand unless the transportation director confirmed that certain data was wrong. The data analysis and interpretation process described in the following sections was conducted as if the data were known to be accurate. The conclusions, as presented in Chapter VI, of course, were made with full consideration given to the strong likelihood that at least some of the data were unreliable.

B. THE DATA ANALYSES

As mentioned above, the only consistent characteristic of the data was a lack of consistency. There was inconsistency in the cost data in each category of vehicle and the differences could not be explained by examining the related nonfinancial characteristics. It was also found that the data frequently gave counter-intuitive indications when they were analyzed for the presence of any overall cost trends that might be associated with the nonfinancial characteristics of activities. The subsections below elaborate in turn on each of these findings. The final subsection of this section discusses the only features of the data that show any consistency.

1. Inconsistencies in Alpha code categories

As mentioned in the general observations made about the data in Chapter IV, one of the first things noticed when examining the cost data in Tables 1 - 4 is the somewhat wild fluctuations in figures within Alpha code groupings. In virtually every category of each of these reports there are numbers differing by orders of magnitude. The smallest standard deviation in any category on any one of these tables is almost 17% of the mean. Such a small deviation is clearly the exception in this group of data. Since the researcher did not undertake to determine conclusively what degree of deviation in the data should be expected, it cannot be stated

here whether a 17% deviation in this type of data is reasonable or not. It can be confidently stated though, that a set of data with deviations that frequently approach, and in some cases exceed, the mean is not a set of data from which reliable conclusions may be derived.

2. Inability to explain data variations

The researcher did look for possible explanations for the most aberrant figures shown in Table 4 by examining the relevant nonfinancial characteristics of Tables 5 and 7. Some of the findings from this process are discussed in the next two paragraphs.

The unusually high costs for the Alpha code B vehicles at NSWC Bethesda and NAS Corpus Christi could possibly be explained by the fact that they own only one and two, respectively, and that these vehicles are unusually old. The only vehicle in this category at Bethesda and one of the two at Corpus Christi, has a model year of 1979. Similarly the extremely high unit cost of Alpha code M vehicles at NAWC Warminster may be explainable by the fact that the average model year of Warminster's six vehicles in this category is 1974. Conversely, the aberrantly low unit cost of Alpha code B vehicles at NAS Meridian might be partially attributable to the fact that it owns only two of these vehicles, one model year 1987 and the other model year 1990. This is a category where the average model year for all activities studied is

1985 (see Table 5). It could also be speculated that the high usage, as indicated by the miles per vehicle figures on Table 7, may account for the low unit costs in the categories noted at each of the following activities: NAS Adak - Alpha codes B, G, and H; NAS Brunswick - Alpha codes G, H, and I; NAS Oceana - Alpha code E; WPNSTA Charleston - Alpha codes G, and I; and NAS Lemoore - Alpha codes E, H, and M.

More credence could have been attributed to the possible explanations tendered above if it were not for the fact that the same type of analysis frequently failed to explain other aberrant figures. No possible explanations were apparent for the unusually high unit costs in the categories noted at the following activities: NSWC Bethesda - Alpha code A; WPNSTA Charleston - Alpha code B; NAS Corpus Christi - Alpha code M; NAS Glenview Alpha codes A, and I; NAS South Weymouth - Alpha code I; and NAS Meridian - Alpha code M. Likewise, there was no obvious factor to explain the unusually low unit costs in Subase New London's Alpha code A and E vehicles or in NAS Adak's Alpha code A vehicles.

The number of unusual figures alone would have made it difficult to explain with any certainty the causes of the fluctuations. The absence of any pattern to the fluctuations makes it virtually impossible to do so. The variations identified in the two preceding paragraphs involve 11 of the 15 activities studied. This fact precludes the possibility of

eliminating from the study activities with questionable figures on their TCR.

3. Counter-intuitive indications of nonfinancial characteristics relative to overall costs

The previous subsection examined nonfinancial factors in relation to activity costs in each Alpha code category. The wide dispersal in and unpredictable nature of the data when broken down by category, convinced the researcher of the need for evaluating more comprehensive cost measures. This subsection discusses the search for any broader indicators that might exist. Table 8 shows the unit cost of the entire administrative vehicle fleet at each activity along with a number of nonfinancial characteristics of that activity and its vehicle fleet. Following is a discussion of the analyses performed using the data in this table.

The cost of operating, attention to preventative maintenance, and average fleet age both individually and as a group, give conflicting signals with respect to overall unit transportation costs. Among Naval Air Stations, some activities evaluated in Appendix C as having low operating cost characteristics (NAS Corpus Christi and NAS Oceana) have a higher overall unit transportation cost than NAS South Weymouth, which was designated as a high cost of operating activity. Among the other activities studied, WPNSTA Charleston (low cost of operating), Subase New London (medium

cost of operating), and NSWC Dahlgren (high cost of operating) show the same unit transportation cost. Similarly, the data show that some activities that attend fairly closely to preventative maintenance requirements (NSWC Bethesda, NAWC Warminster, NAS Oceana, and NAS Glenview) have higher unit costs than some that neglect preventative maintenance (Subase New London, and NAS South Weymouth). Since data from only one year were analyzed, this could possibly reflect a short term cost savings gained by the activities not regularly performing preventative maintenance. Generally speaking, though, one would expect that activities that neglect preventative maintenance would suffer more frequent, severe, and costly vehicle breakdowns. Finally, some activities with older fleets (Subase New London, NAS Lemoore, and NAS Adak) have lower unit costs than other activities with newer vehicles (NAWC Lakehurst, and NAS Meridian).

An argument could be made that each of the above are counter-intuitive. The researcher recognized, though, that if identifiable cost trends existed they may exist in relation to combinations of characteristics rather than any one characteristic. One possible combination of characteristics that the researcher felt may be predictive of cost movements was the set of characteristics discussed individually in the preceding paragraph. Logically, one would think that an older fleet at an activity with a high operating cost that tended to neglect preventative maintenance would, in the long run, have

a higher unit cost than an activity opposite in each of those characteristics. No combination of activities, among those included in this study, could be identified that contrasted so starkly in each of these three characteristics. One might have expected, though, by the line of logic stated above, that the unit costs at Subase New London and NAS South Weymouth should be noticeably higher than the unit costs at WPNSTA Charleston and NAS Meridian respectively. This is because the vehicle fleet ages and costs of operating at the former two activities are relatively higher than at the latter two. Also the former two, unlike the latter two, tend to neglect preventative maintenance. Instead, the unit costs at these activities were found to be very similar.

Another set of characteristics tested individually and in combination was average miles per vehicle, number of mechanics, and number of vehicles. The only definitive conclusion possible from these analyses was that the activities with extremely high averages in the miles per vehicle category (NAS Brunswick, NAS Adak, and NAS Lemoore) also showed the lowest overall unit costs. Testing for the same trend among activities with average miles per vehicle figures closer to the median produced mixed results. Some activities with low mileage per vehicle (NAS Corpus Christi and NAS Jacksonville, for example) have lower unit costs than some activities with higher miles per vehicle (NSWC Bethesda, NAS Oceana, and NAS Glenview).

The homogeneity among Naval Air Stations in the vehicle assignment characteristic rendered it effectively irrelevant for the purposes of this study. Though there exists some diversity in this characteristic among the other activities studied, such a small basis for comparison cannot lead to any meaningful conclusions.

4. The only consistent features of the data

In stark contrast to the general wide dispersal in the data were the unit costs for Alpha codes E, G, and H and for the overall fleets. One possible explanation for the relatively narrow range of unit costs within Alpha codes G and H is that these are the two categories that represent the bulk of the vehicle fleets at most activities. The vehicles in these two categories are predominantly pickup trucks, and they comprise over 60% of the vehicles owned by the activities studied. Since most activities own a relatively large number of vehicles in these categories, it would be quite reasonable that the costs to activities in these categories should be more stable. In categories with only a few vehicles, one or two substandard vehicles could easily inflate the overall costs within those categories. Categories with larger numbers of vehicles are insulated somewhat against such distortions. This explanation, though, doesn't hold with respect to Alpha code E vehicles (predominantly station wagons). This category generally contains less than 5% of an activity's fleet.

It is more difficult to offer a plausible explanation for the relatively stable unit costs of the overall fleets. It might be thought that the relative stability in Alpha codes G and H weight the overall unit cost so heavily that the tight grouping of the overall costs is understandable. This doesn't follow though. For, while Alpha codes G and H contain over 60% of the vehicles studied, they represent only approximately 50% of the total costs. It is not logical that this set of data, which shows significant dispersal in vehicle categories that represent half of the transportation costs at the activities studied, should produce such a tight grouping in the overall figures. The researcher can only conclude that the more consistent overall figures are more coincidental than meaningful.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. Absence of patterns in Navy transportation costs

It is quite evident that the data collected and analyzed for this study provide no basis for identifying trends in Navy passenger vehicle costs. Three characteristics of the data were the primary factors in leading the researcher to this conclusion. These are the questionable quality of the data, the wide dispersal in the data, and the lack of any discernible patterns in the dispersal of the data.

a. Questionable data quality

Even had the data collected been extremely consistent, it would have been tenuous to confidently draw from it any definitive conclusions. The comments made to the researcher about the quality of the data before they were collected and the researcher's own observations about the data quality during the analysis process would have made the researcher very cautious about ascribing much significance to any trends. When the prevailing attitude in the Navy transportation world is that the cost reporting is marginal, at best, and the cost reports, when available, are often found to be mistake-ridden, a healthy level of skepticism about the implications of a collection of these reports seems

appropriate. This is one reason the researcher is inclined to dismiss as coincidence the relatively higher degree of consistency found in the cost per mile figures of the overall fleets and in Alpha codes E, G and H. Another reason for doubting the significance of the apparent consistency in the overall fleet cost figures is discussed in the next paragraph.

b. Wide dispersal in data

When presented with a set of data with such extreme fluctuations as the set analyzed for this study, data interpretation becomes quite a challenging process. If the starting assumption in analyzing a set of data is that the set accurately reflects reality, such fluctuations would seem to imply that the data are very sensitive to whatever factors affect them. In the case of this study, it is not clear to the researcher why Navy transportation costs should be as sensitive to any factor or combination of factors as the data collected would imply that they are. It was difficult then to infer meaning from a set of data that seemed so illogically sensitive.

This difficulty also applies with regard to the apparent consistency in the overall fleet unit costs. It doesn't make sense to the researcher that such a generally chaotic set of data can produce a meaningful summary measure. Were this phenomenon to be observed over a period of years, perhaps it could be, though inexplicable, somehow meaningful.

The only thing, however, that would have lent meaning to the widely dispersed set of data collected for this study would have been some identifiable pattern in the dispersal. The next paragraph discusses the absence of any such pattern.

c. Absence of any pattern in the data dispersal

Were some widely dispersed data found to move consistently with the movements of some influencing factor(s), their dispersal would, perhaps, be not at all troubling. As discussed at length in Chapter V, such is not the case with the data analyzed for this study. No factor, or set of factors, was found to have a predictable effect on the cost data. Even for the data that seemed to be consistent (total fleet unit costs, and Alpha codes E, G, and H unit costs) nothing could be identified that explained the cost movements. The absence of any pattern in the data dispersal clearly supports the feeling that the data are of generally poor quality. Unfortunately, such a conclusion casts doubt on the possibility of successfully using data like those gathered for this study to identify and explain trends in Navy transportation costs. A related conclusion of the researcher is that, even with good data, it may have been quite difficult to identify a set of characteristics that consistently explain the differences in transportation costs between activities. This conclusion is discussed next.

2. Inherent difficulty in identifying transportation cost patterns

Naval activities are not a homogeneous lot. This study attempted to account for their regional and functional diversities. Consideration was also given to differences in the size of the activities, the size of their transportation work force, the age of their vehicle fleet, vehicle usage levels, and their attention to preventative maintenance. Even with this limited number of activity and fleet characteristics to consider, it was difficult to evaluate the cost figures with respect to all possible combinations of these characteristics. In the data analysis process some other activity characteristics with potential transportation cost ramifications were mentioned to, or discovered by, the researcher. These are discussed below.

One factor mentioned to the researcher as a possible cost-affecting characteristic is the number of customers served by a transportation office [Ref. 22]. This is especially true if a number of off-site customers are served. Serving a wide customer base increases administrative costs and makes it more difficult to keep vehicles properly serviced. It also occurred to the researcher that the extent to which a transportation organization works on a reimbursable basis might affect their costs. It seems logical that, if organizations are required to pay for the services of vehicles, they will be more conscientious users of them. This

would imply that activities operating from a revolving fund, where all services are provided at cost, may have lower unit transportation costs. Other possible cost factors include the priorities of the activity commander and the availability of qualified labor.

The conclusion of the researcher relative to the above discussion is that, given the large number of factors that may affect the transportation costs of an activity, it would be very difficult to identify a set of characteristics that would consistently explain the differences between activities' transportation costs. Thus, it would also be difficult to categorize a larger group of Naval activities according to their transportation costs, even if the cost data were considered reliable.

3. Need for improvement in cost reporting system

In this day of budget austerity, a premium has been put on operational efficiency and effectiveness. It is not enough just to cut costs; the right costs must be cut if efficiency and effectiveness are to be improved. Identifying the areas of excess spending can be difficult, even with good cost accounting and reporting systems in place. Trying to do so without good cost information will be like "shooting in the dark". The competitive environment that the requirements of Chapter 20 of COBRA place Navy transportation organizations in makes it even more important that they be able to accurately

assess their cost of doing business. Clearly, the system, or people for doing this are, in general, not currently in place. Failure to address this deficiency could make Navy transportation organizations less competitive with GSA and the commercial sector. Certainly, it will hurt their ability to operate efficiently and effectively.

4. Managerial and administrative costs should be considered to determine similarity between activities

As mentioned earlier the researcher initially made the assumption that the costs of managing and providing administrative support for transportation organizations would be so similar between activities that they could safely be ignored for the purposes of this study. The researcher later decided that it was incorrect to declare these costs irrelevant without seeking to determine what characteristics of activities they are related to. It is easily imaginable that large activities may realize some economies of scale in their managerial and administrative transportation costs that are not achievable at smaller activities. These economies of scale might make the larger activities' overall costs more competitive with those of GSA and the commercial sector. This could be true even if the direct unit costs of a large and a small activity were very similar.

The researcher did not come to this conclusion until after it had become obvious that the data collected were too

unreliable to allow any conclusions about transportation cost similarities between activities. Studying data on managerial and administrative costs at that point could not have lead to any conclusions relevant to this study.

B. RECOMMENDATIONS

1. Continue to investigate the feasibility of sampling

The data in this study do not justify using sampling to complete the COBRA studies. This does not mean that sampling is impossible. The researcher's conclusion is only that sampling categories cannot be established based on an analysis of activities' cost reports. Considering the time and cost savings that would likely result from using a sampling technique for the COBRA studies, the researcher's opinion is that it is too early to give up on this alternative.

The first activities to be competed against GSA and the commercial sector under COBRA should be chosen so that the results of the studies may shed light on the feasibility of using sampling. If the in-depth cost analyses and bidding process at these activities imply that some activities can be grouped based on the similarity of their transportation costs, consideration should be given to completing the remainder of the cost studies in these by groups using sampling.

2. Improve transportation cost reporting systems

Three primary problems in the Navy transportation cost reporting system were identified in the course of this study. They are untrained personnel, problems with computer and software systems, and inability of the transportation organization to control the input into the TCR's.

In a number of cases neither the transportation director, nor anyone else the researcher spoke with at an activity, appeared to completely understand the reporting format of the TCR. There seemed to be not only a lack of awareness of what was in the TCR, but also a lack of awareness of what was supposed to be in it. Obviously, the cost reporting system cannot be expected to improve until the people responsible for preparing the reports understand the format.

Several comments were made to the researcher by activity transportation personnel about computer and software problems making the job of producing good cost data even harder. It also appears that various software systems are used to produce the TCR's. Computer upgrades and standardized software might improve the product of the cost reporting system.

The fact that people outside the transportation organization provide information to the controller for inclusion in the TCR without the information first being screened for obvious discrepancies by anyone in the

transportation organization likely accounts for some of the quality problems. The researcher recommends that all information submitted for inclusion in a TCR be routed through the transportation organization for verification.

C. AREAS FOR FURTHER STUDY

Some further questions suggested by this study are as follows:

1. What can be done to improve the Navy's transportation cost reporting system?

2. If cost data are reliable, are Navy transportation organizations competitive with GSA and the private sector?

3. What adjustments to the bids of the in-house transportation organization, GSA, and any commercial bidders would be necessary to insure that the bids are evaluated on an equal footing? This would include, in part, studying what costs of ownership should be included in the in-house bid to make it comparable with other bids received and identifying and quanitfying additional costs to the Navy that would be generated were transportation services to be provided by GSA or a contractor.

4. What are the procurement and disposal costs that should be included when developing the in-house cost estimate?

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20. Telephone conversation between Mr. Tom Smith, Naval Air Station Brunswick, Transportation Director, and the author, 3 May 1993.

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APPENDIX A. ORIGINAL SPREADSHEET

EXPLANATION OF COLUMN HEADINGS

* Claimant UIC - The unit identification code of the major claimant for each activity.

* Total 01-04 - The total number of vehicles in codes 01 through 04 (administrative vehicles).

* 01, 02, 03, and 04 quantity - The number of vehicles in each category.

* 01, 02, 03, and 04/TOT - The percentage of the total each code represents.

ACTIVITY NAME	CLAIMANT UIC	TOTAL 01-04	01 QTY	02 QTY	03 QTY	04 QTY	01/TOT	02/TOT	03/TOT	04/TOT
RSC 098										
NAVUNSEAWARCENDIV KEYPORT WA	24	348	12	30	171	135	0.03	0.09	0.49	0.39
NAVAIRWARCENACDIV LAKEHURST NJ	19	221	29	41	134	17	0.13	0.19	0.61	0.08
NAVAIRWARCENACDIV INDIANAPOLIS	19	29	2	3	18	6	0.07	0.10	0.62	0.21
NAVUNSEAWARCENDIV NEWPORT RI	24	74	2	9	48	15	0.03	0.12	0.65	0.20
NAVSURFWARCEN CARDEROCKDIV MD	24	115	15	15	71	14	0.13	0.13	0.62	0.12
NAVSURFWARCEN COASTSYSTA FL	24	130	8	11	88	23	0.06	0.08	0.68	0.18
NAVSURFWARCENDIV DAHLGREN VA	24	488	115	83	262	28	0.24	0.17	0.54	0.06
NAVAIRWARCENWPNDIV WHITE SAND	24	80	5	9	52	14	0.06	0.11	0.65	0.18
NAVSURFWARCENDIV INDIAN HEAD	24	397	26	76	251	44	0.07	0.19	0.63	0.11
NAVAIRWARCENACDIV PATUXENT MD	19	368	23	56	245	44	0.06	0.15	0.67	0.12
NAVAIRWARCENACDIV CHINA LAKE	19	992	27	67	854	11	0.03	0.07	0.86	0.01
NAVAIRWARCENACDIV WARMINSTER	19	77	8	9	48	12	0.10	0.12	0.62	0.16
NAVAIRWARCENACDIV TRENTON NJ	19	35	2	6	23	4	0.06	0.17	0.66	0.11
MEAN		258	21	32	174	28	0	0	1	0
STANDARD DEVIATION		259	29	28	214	33	0	0	0	0
NAVSTA PUGET SOUND	70	93	14	7	71	1	0.15	0.08	0.76	0.01
NAVSTA MAYPORT FL	60	430	65	52	291	22	0.15	0.12	0.68	0.05
NAVSTA ROOSEVELT ROADS PR	60	517	66	59	341	51	0.13	0.11	0.66	0.10
NAVSTA NEW YORK NY	60	201	36	24	122	19	0.18	0.12	0.61	0.09
NAVSTA INGLESIDE TX	60	173	30	21	107	15	0.17	0.12	0.62	0.09
MEAN		283	42	33	186	22	0	0	1	0
STANDARD DEVIATION		162	20	20	108	16	0.02	0.02	0.06	0.03
RSC 094										
NAVCOM DET CHELTENHAM MD	63	18	6	2	10	0	0.33	0.11	0.56	0.00
NAVCOMMSTA STOCKTON CA	63	48	2	5	38	3	0.04	0.10	0.79	0.06
NAVCOMUNIT MARQUETTE	63	12	0	6	4	2	0.00	0.50	0.33	0.17
NAVCOMTELSTA ROOSEVELT RDS PR	63	19	1	1	17	0	0.06	0.06	0.94	0.00
NAVCOMTELSTA CUTLER ME	63	47	2	8	34	3	0.04	0.17	0.72	0.06
NAVCOMTELSTA DET ALBANY GA	63	2	1	0	1	0	0.50	0.00	0.50	0.00
NAVCOMTELSTA PUGET SOUND	63	27	1	7	17	2	0.04	0.26	0.63	0.07
NAVCOMTELSTA JACKSONVILLE FL	63	18	4	1	13	0	0.22	0.06	0.72	0.00
NAVRADSTA SUGAR GROVE	63	40	4	5	31	0	0.10	0.13	0.78	0.00
MEAN		26	2	4	18	1	0.15	0.15	0.66	0.04
STANDARD DEVIATION		15	2	3	12	1	0.16	0.14	0.17	0.05

ACTIVITY NAME	CLAIMANT UIC	TOTAL 01-04	01 QTY	02 QTY	03 QTY	04 QTY	01/TOT	02/TOT	03/TOT	04/TOT
RSC 093										
NAVMEDCLINIC PORTSMOUTH NH	18	18	0	14	4	0	0.00	0.78	0.22	0.00
NAVMEDLINIC ANNAPOLIS MD	18	5	0	5	0	0	0.00	1.00	0.00	0.00
NAVMEDCLICIC QUANTICE VA	18	4	0	4	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC KEY WEST FL	18	3	0	3	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC SEATTLE WA	18	2	0	2	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC PT HUENEME CA	18	9	0	9	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC NEW ORLEANS LA	18	4	0	4	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC PEARL HARBOR HI	18	15	0	15	0	0	0.00	1.00	0.00	0.00
NAVMEDCLINIC PHILADELPHIA PA	18	37	7	14	16	0	0.19	0.38	0.43	0.00
MEAN		10.78	0.78	7.78	2.22	0.00	0.02	0.91	0.07	0.00
STANDARD DEVIATION		10.66	2.20	4.98	5.03	0.00	0.06	0.20	0.14	0.00
NAVHOSP PORTSMOUTH VA	18	85	11	36	38	0	0.13	0.42	0.45	0.00
NAVSOSP ROOSEVELT ROADS PR	18	9	0	9	0	0	0.00	1.00	0.00	0.00
NAVHOSP GUAM	18	25	0	25	0	0	0.00	1.00	0.00	0.00
NAVHOSP PENSACOLA FL	18	32	0	32	0	0	0.00	1.00	0.00	0.00
NAVHOSP GREAT LAKES IL	18	12	0	12	0	0	0.00	1.00	0.00	0.00
NAVHOSP JACKSONVILLE FL	18	27	0	27	0	0	0.00	1.00	0.00	0.00
NAVHOSP SAN DIEGO CA	18	37	2	35	0	0	0.05	0.95	0.00	0.00
NAVHOSP CORPUS CHRISTI TX	18	15	0	15	0	0	0.00	1.00	0.00	0.00
NAVHOSP OAKLAND CA	18	26	0	26	0	0	0.00	1.00	0.00	0.00
NAVHOSP TWENTYNINE PALMS CA	18	16	0	7	9	0	0.00	0.44	0.56	0.00
NAVHOSP MILLINGTON TN	18	7	0	7	0	0	0.00	1.00	0.00	0.00
NAVHOSP BEAUFORT SC	18	34	5	15	14	0	0.15	0.44	0.41	0.00
NAVHOSP GROTON CT	18	5	0	5	0	0	0.00	1.00	0.00	0.00
NAVHOSP ORLANDO FL	18	8	0	8	0	0	0.00	1.00	0.00	0.00
NAVHOSP CHERRY PT NC	18	12	1	6	5	0	0.08	0.50	0.42	0.00
NAVHOSP LEMOORE CA	18	5	0	5	0	0	0.00	1.00	0.00	0.00
NAVHOSP OAK HARBOR WA	18	5	0	5	0	0	0.00	1.00	0.00	0.00
NAVHOSP PATUXENT RIVER MD	18	6	0	6	0	0	0.00	1.00	0.00	0.00
NAVHOSP CHARLESTON SC	18	10	0	10	0	0	0.00	1.00	0.00	0.00
NAVHOSP NEWPORT RI	18	10	0	10	0	0	0.00	1.00	0.00	0.00
NAVHOSP LONG BEACH CA	18	11	0	11	0	0	0.00	1.00	0.00	0.00
NAVHOSP CAMP LEJEUNE NC	18	52	4	15	33	0	0.08	0.29	0.63	0.00
NAVHOSP CAMP PENDLETON CA	18	97	9	35	53	0	0.09	0.36	0.55	0.00
NAVHOSP BREMERTON WA	18	11	0	11	0	0	0.00	1.00	0.00	0.00
MEAN		23.21	1.33	15.54	6.33	0.00	0.02	0.85	0.13	0.00
STANDARD DEVIATION		23.72	2.92	10.52	13.97	0.00	0.04	0.26	0.22	0.00

ACTIVITY NAME	CLAIMANT UIC	TOTAL 01-04	01 QTY	02 QTY	03 QTY	04 QTY	01/TOT	02/TOT	03/TOT	04/TOT
RSC 04										
NSY PORTSMOUTH NH	24	211	21	61	81	48	0.10	0.29	0.38	0.23
NSY LONG BEACH CA	24	707	91	91	453	72	0.13	0.13	0.64	0.10
NSY PHILADELPHIA PA	24	709	101	89	324	195	0.14	0.13	0.46	0.28
NSY NORFOLK VA	24	632	28	172	329	103	0.04	0.27	0.52	0.16
NSY PUGET SOUND BREMERTON WA	24	427	3	63	257	104	0.01	0.15	0.60	0.24
NSY CHARLESTON SC	24	616	74	103	379	60	0.12	0.17	0.62	0.10
NSY MARE ISLAND VALLEJO CA	24	628	30	46	412	140	0.05	0.11	0.28	0.11
MEAN		561.43	49.71	89.29	319.29	103.14	0.08	0.18	0.50	0.17
STANDARD DEVIATION		167.43	35.30	43.48	52.86	45.10	0.05	0.06	0.12	0.07
NSC NORFOLK VA	23	61	0	14	38	9	0.00	0.23	0.62	0.15
NSC PUGET SOUND BREMERTON WA	23	54	0	11	33	10	0.00	0.20	0.61	0.19
NSC CHEATHAM ANX WILLIAMSBG VA	23	68	0	15	43	10	0.00	0.22	0.63	0.15
NSC JACKSONVILLE FL	23	33	0	11	10	12	0.00	0.33	0.30	0.36
MEAN		54.00	0.00	12.75	31.00	10.25	0.00	0.25	0.54	0.21
STANDARD DEVIATION		13.10	0.00	1.79	12.63	1.09	0.00	0.05	0.14	0.09
NORTHNAVFACENGCOM PHIL PA	25	132	13	0	119	0	0.10	0.00	0.90	0.00
WESTNAVFACENGCOM SAN BRUNO CA	25	288	2	0	286	0	0.01	0.00	0.99	0.00
CHESNAVFACENGCOM WASH DC	25	71	2	1	68		0.03	0.01	0.96	0.00
SOUTHNAVFACENGCOM CHARLESTN SC	25	198	3	1	193	1	0.02	0.01	0.97	0.01
MEAN		172.25	5.00	0.50	166.50	0.33	0.04	0.00	0.96	0.00
STANDARD DEVIATION		80.52	4.64	0.50	82.07	0.47	0.04	0.01	0.03	0.00
SUPSHIP CHARLESTON SC	24	33	8	1	24	0	0.24	0.03	0.73	0.00
SUPSHIP PORTSMOUTH VA	24	27	15	1	11	0	0.56	0.04	0.41	0.00
SUPSHIP BATH ME	24	9	5	0	4	0	0.56	0.00	0.44	0.00
SUPSHIP NEWPORT NEWS VA	24	6	5	0	1	0	0.83	0.00	0.17	0.00
MEAN		18.75	8.25	0.50	10.00	0.00	0.55	0.02	0.44	0.00
STANDARD DEVIATION		11	4	1	9	0	0.21	0.02	0.20	0.00
WPNSTA YORKTOWN VA	24	413	26	67	237	83	0.06	0.16	0.57	0.20
WPNSTA CHARLESTON SC	24	1096	20	122	535	419	0.02	0.11	0.49	0.38
WPNSTA CONCORD CA	24	318	21	41	174	82	0.07	0.13	0.55	0.26
WPNSTA SEAL BEACH CA	24	391	12	86	214	79	0.03	0.22	0.55	0.20
WPNSTA EARLE COLTS NECK NJ	24	286	23	69	110	84	0.08	0.24	0.38	0.29
NAVAIRWPNSTA PT MUGU CA	19	603	47	80	389	87	0.08	0.13	0.65	0.14
MEAN		517.83	24.83	77.50	276.50	139.00	0.06	0.17	0.53	0.25
STANDARD DEVIATION		277.57	10.79	24.40	143.28	125.24	0.02	0.05	0.08	0.08
CBC DAVISVILLE RI	25	30	4	5	19	2	0.13	0.17	0.63	0.07
CBC PT HUENEME CA	25	353	33	46	214	60	0.09	0.13	0.61	0.17
CBC GULFPORT MS	25	154	25	25	89	15	0.16	0.16	0.58	0.10
MEAN		179.00	20.67	25.33	107.33	25.67	0.13	0.15	0.61	0.11
STANDARD DEVIATION		133.04	12.23	16.74	80.66	24.85	0.03	0.02	0.02	0.04

ACTIVITY NAME	CLAIMANT UIC	TOTAL 01-04	01 QTY	02 QTY	03 QTY	04 QTY	01/TOT	02/TOT	03/TOT	04/TOT
RSC 05										
NAS SOUTH WEYMOUTH MA	72	83	4	9	63	7	0.05	0.11	0.76	0.08
NAS WILLOW GROVE PA	72	112	6	14	89	3	0.05	0.13	0.79	0.03
NAF WASHINGTON DC	72	68	4	4	58	2	0.06	0.06	0.85	0.03
NAS ATLANTA GA	72	57	2	7	47	1	0.04	0.12	0.82	0.02
NAS NEW ORLEANS	72	77	6	9	59	3	0.08	0.12	0.77	0.04
NAS DALLAS TX	72	102	6	9	85	2	0.06	0.09	0.83	0.02
NAF DETROIT	72	46	4	5	35	2	0.09	0.11	0.76	0.04
NAS GLENVIEW IL	72	88	9	9	64	6	0.10	0.10	0.73	0.07
MEAN		79.13	5.13	8.25	62.50	3.25	0.07	0.10	0.79	0.04
STANDARD DEVIATION		20.65	1.96	2.86	16.73	1.98	0.02	0.02	0.04	0.02
NAS NORFOLK VA	60	0					ERR	ERR	ERR	ERR
NAS JACKSONVILLE FL	60	481	41	73	303	64	0.09	0.15	0.63	0.13
NAS KEY WEST	60	412	42	54	297	19	0.10	0.13	0.72	0.05
NAS BRUNSWICK ME	60	216	17	26	158	15	0.08	0.12	0.73	0.07
NAS OCEANA VA	60	364	22	58	248	36	0.06	0.16	0.68	0.10
NAS CECIL FIELD FL	60	337	19	57	218	43	0.06	0.17	0.65	0.13
MEAN		362.00	28.20	53.60	244.80	35.40	0.08	0.15	0.68	0.10
STANDARD DEVIATION		87.87	10.98	15.29	53.62	17.67	0.02	0.02	0.04	0.03
NAS PENSCOLA FL	62	0					ERR	ERR	ERR	ERR
NAS CORPUS CHRISTI TX	62	254	25	20	200	9	0.10	0.08	0.79	0.04
NAS MEMPHIS TN	62	275	30	37	204	4	0.11	0.13	0.74	0.01
NAS KINGSVILLE TX	62	161	16	19	117	9	0.10	0.12	0.73	0.06
NAS CHASE FIELD TX	62	134	14	15	98	7	0.10	0.11	0.73	0.05
NAS WHITING FLD MILTON FL	62	113	11	11	78	13	0.10	0.10	0.69	0.12
NAS MERIDIAN MS	62	155	12	15	115	13	0.08	0.10	0.74	0.08
MEAN		182.00	18.00	19.50	135.33	9.17	0.10	0.11	0.74	0.06
STANDARD DEVIATION		60.65	7.05	8.36	48.87	3.18	0.01	0.02	0.03	0.03
NAS ALAMEDA	70	0					ERR	ERR	ERR	ERR
NAS MOFFETT FIELD CA	70	231	22	28	171	10	0.10	0.12	0.74	0.04
NAF EL CENTRO CA	70	88	7	4	75	2	0.08	0.05	0.85	0.02
NAS ADAK AK	70	249	25	41	165	18	0.10	0.16	0.66	0.07
NAS FALLON NV	70	211	22	14	166	9	0.10	0.07	0.79	0.04
NAS LEMOORE CA	70	351	29	49	243	30	0.08	0.14	0.69	0.09
NAS WHIDBEY ISLAND WA	70	290	18	19	250	3	0.06	0.07	0.86	0.01
MEAN		236.67	20.50	25.83	178.33	12.00	0.09	0.10	0.77	0.05
STANDARD DEVIATION		80.48	6.90	15.46	58.28	9.61	0.01	0.04	0.08	0.03

ACTIVITY NAME	CLAIMANT UIC	TOTAL 01-04	01 QTY	02 QTY	03 QTY	04 QTY	01/TOT	02/TOT	03/TOT	04/TOT
RSC 09B										
NAVINVSERV NEREG NEWPORT RI	11	17	11	0	6	0	0.65	0.00	0.35	0.00
NAVINVSERV MIDLANTREG NORFOLK	11	55	51	0	4	0	0.93	0.00	0.07	0.00
NAVINVSERV SWREG SAN DIEGO CA	11	29	26	0	3	0	0.90	0.00	0.10	0.00
NAVINVSERV NWREG SAN FRANCSICO	11	7	2	0	5	0	0.29	0.00	0.71	0.00
NAVINVSERN MIDPAC P HARBOR HI	11	8	6	0	2	0	0.75	0.00	0.25	0.00
MEAN		23.20	19.20	0.00	4.00	0.00	0.70	0.00	0.30	0.00
STANDARD DEVIATION		17.76	17.86	0.00	1.41	0.00	0.23	0.00	0.23	0.00
NAVRESREDCOM REG SIX WASH DC	72	24	1	1	22	0	0.04	0.04	0.92	0.00
NAVRESREDCOM REG 10 N ORLEANS	72	47	3	2	42	0	0.06	0.04	0.89	0.00
NAVRESREDCOM REG 20 SANFRAN CA	72	25	2	0	23	0	0.08	0.00	0.92	0.00
NAVRESREDCOM REG 22 SEATTLE WA	72	40	1	1	38	0	0.03	0.03	0.95	0.00
NAVRESREDCOM REG 5 RAVENNA OH	72	31	1	1	29	0	0.03	0.03	0.94	0.00
NAVRESREDCOM REG 13 GRLAKES IL	72	27	1	1	25	0	0.04	0.04	0.93	0.00
NAVRESREDCOM REG 4 PHILA PA	72	28	2	1	25	0	0.07	0.04	0.89	0.00
NAVRESREDCOM REG 18 OLATHE KS	72	29	2	0	27	0	0.07	0.00	0.93	0.00
NAVRESREDCOM REG 9 MEMPHIS TN	72	24	1	0	23	0	0.04	0.00	0.96	0.00
NAVRESREDCOM REG 16 MINN MN	72	26	1	0	25	0	0.04	0.00	0.96	0.00
NAVRESREDCOM REG 19 S DIEGO CA	72	31	2	1	28	0	0.06	0.03	0.90	0.00
NAVRESREDCOM REG 1 NEWPORT RI	72	24	1	2	21	0	0.04	0.08	0.88	0.00
NAVRESREDCOM REG 7 CHASN SC	72	22	1	0	21	0	0.05	0.00	0.95	0.00
NAVRESREDCOM REG 2 SCOTIA NY	72	36	4	1	31	0	0.11	0.03	0.86	0.00
NAVRESREDCOM REG 8 JAX FL	72	26	2	2	22	0	0.08	0.08	0.85	0.00
NAVRESREDCOM REG 11 DALLAS TX	72	20	1	0	19	0	0.05	0.00	0.95	0.00
MEAN		28.75	1.63	0.81	26.31	0.00	0.06	0.03	0.92	0.00
STANDARD DEVIATION		6.82	0.86	0.73	6.07	0.00	0.02	0.03	0.03	0.00
RSC 09Z										
NAVSECGRUACT WINTER HARBOR ME	69	41	5	5	28	3	0.12	0.12	0.68	0.07
NAVSECGRUACT SABANA SECA PR	69	47	3	6	34	4	0.06	0.13	0.72	0.09
NAVSECGRUACT ECCN CHARLESTN SC	69	17	1	1	12	3	0.06	0.06	0.71	0.18
NAVSECGRUACT HOMESTEAD FL	69	19	4	0	15	0	0.21	0.00	0.79	0.00
NAVSECGRUACT FORT GEO MEADE MD	69	5	3	0	2	0	0.60	0.00	0.40	0.00
NAVSECGRUACT ADAK AK	69	50	2	9	38	1	0.04	0.18	0.76	0.02
NAVSECGRUACT ANCHORAGE	69	4	1	0	3	0	0.25	0.00	0.75	0.00
MEAN		26.14	2.71	3.00	18.86	1.57	0.19	0.07	0.69	0.05
STANDARD DEVIATION		18.11	1.39	3.38	13.51	1.59	0.18	0.07	0.12	0.06

APPENDIX B. INFORMATION IN CASEMIS REPORT

ALPHA CODE	MODEL YEAR	QTY
A	85	2
A	86	7
A	88	1
A	90	4
B	79	1
B	80	2
B	81	3
B	82	1
B	86	4
B	87	1
B	90	1
B	91	1
B	92	2
D	75	2
D	77	1
D	83	11
E	83	1
E	85	1

APPENDIX C. COST OF OPERATING INFORMATION

COST OF OPERATING INFORMATION

	FUEL $'S PER GALLON		LABOR		OVERALL	COST OF
	CPI	TCR	WAGE SURVEY	TCR	CPI	OPERATING
NSWC DAHLGREN		0.91		20.62		HIGH
NSWC BETHESDA	1.185	?	14.80	26.96	145.1	MED
SUBBASE NEW LONDON	1.24	0.80		16.78	149.2	MED
WPNSTA CHARLESTON	1.092	0.81	13.70	19.55	136.9	LOW
NAWC WARMINSTER	1.19	0.80	16.22	21.00	147.6	HIGH
NAWC LAKEHURST	1.19	0.84	16.22	17.14	147.6	HIGH
NAS CORPUS CHRISTI	1.085	0.83	11.50	17.27		LOW
NAS BRUNSWICK	1.152	0.81		17.77	147.1	MEDIUM
NAS OCEANA	1.117	0.83	13.06	17.82	136.9	LOW
NAS GLENVIEW	1.205	0.74	16.09	21.34	138.2	HIGH
NAS LEMOORE	1.223	1.13	12.03	?	141.6	MED
NAS SOUTH WEYMOUTH	1.18	0.81	15.96	18.74	149.8	HIGH
NAS JAX	1.111	0.83		18.47	136.9	LOW
NAS ADAK						
NAS MERIDIAN	1.09		11.60	20.13	136.9	MED

* FUEL DOLLARS PER GALLON CPI = THE CONSUMERS PRICE INDEX FOR THE AREA OF THE ACTIVITY DURING CALENDAR YEAR 1992 AS REPORTED BY THE BUREAU OF LABOR STATISTICS.

* FUEL DOLLARS PER GALLON TCR = THE PRICE OF GASOLINE IN DOLLARS PER GALLON FOR AN ACTIVITY AS CALCULATED FROM THEIR TRANSPORTATION COST REPORT.

* LABOR WAGE SURVEY = THE AVERAGE WAGE PAID TO A CIVILIAN AUTO MECHANIC IN THE AREA OF THE ACTIVITY AS REPORTED BY THE DEPARTMENT OF LABOR'S WAGE SURVEY DEPARTMENT.

* LABOR TCR = THE AVERAGE WAGE RATE, INCLUDING FRINGES, PAID TO THE AUTO MECHANICS AT AN ACTIVITY AS CALCULATED FROM THEIR TRANSPORTATION COST REPORT.

* OVERALL CPI = THE OVERALL CONSUMERS PRICE INDEX IN THE AREA OF THE ACTIVITY AS REPORTED BY THE BUREAU OF LABOR STATISTICS.

* COST OF OPERATING = THE RELATIVE CATEGORY DETERMINED FOR THE ACTIVITY FROM THE ABOVE DATA.

APPENDIX D. LIST OF INTERVIEWS

1. Mr. George Borucki, NAS Glenview, IL, 23 March 93.
2. Mr. Tony Mcdowell, NAS Lemoore, CA, 18 March 93.
3. Mr. Ed Linke, NAWC Warminster, MA, 22 March 93.
4. Mr. Craig Holly, Naval Subase New London, CT, 22 March 93.
5. Mr. Nick Torres, Naval Station New York, NY, 18 March 93.
6. Mr. Paul Hansen, Naval Weapons Station Charleston, SC, 19 March 93.
7. Mr. Eddie Ochoa, NAS Corpus Christi, TX, 22 March 93.
8. Mr. Ed Dempsey, NAS Meridian, MS, 16 March 93.
9. Mr. Ray Murden, NAS Oceana, VA, 18 March 93.
10. Mr. John Tilton, NAWC Lakehurst, NJ, 22 March 93.
11. EOCS Salois, NAS Adak, AK, 27 March 93.
12. Mr. Jimmy Moten, Naval Weapons Station Concord, CA, 18 March 93.
13. Mr. Rick Hote, NAS South Weymouth, MA, 23 March 93.
14. Mr. Chuck Wilson, NAS Jacksonville, FL, 23 March 93.
15. Mr. Tom Smith, NAS Brunswick, ME, 22 March 93.
16. Mr. John Fleming, NAS Atlanta, GA, 19 March 93.
17. Mr. Jan Fluegge, Naval Shipyard Long Beach, CA, 12 March 93.
18. Mr. Mike Stewart, Naval Construction Battalion Center Port Hueneme, CA, 19 March 93.
19. Mr. Tom Hackney, NSWC Dahlgren, VA, 18 March 93.
20. Mr. Harold Ralston, NSWC Bethesda, MD, 19 March 93.

APPENDIX E. ACTIVITY TRANSPORTATION DATA TABLES

Column heading explanations

TOT $'s/MI (top line) -- total direct costs for entire administrative vehicle fleet divided by mileage accumulated for the year on all administrative vehicles.

Number mechanics -- number of mechanics at the activity that work on administrative vehicles.

Number MGR/Admin -- number of managers, supervisors, and administrative employees in the transportation organization.

Main assignment -- the predominant vehicle assignment at the activity, A (to an individual), B (to an organization), or C (motor pool vehicle). Where an activity provided the percent of the fleet in the main assignment, this percentage is recorded.

Remote location -- is the activity more than 30 miles from a major population center.

Fuel cost per gallon -- average price paid for unleaded fuel during FY '92. This information was provided by the transportation director at each activity.

Avg labor rate -- total labor dollars divided by the total number of labor hours. Figured from information on the TCR.

Veh code -- alpha code category.

-- number of vehicles in each category at the activity.

% of fleet -- percentage of the administrative vehicle fleet represented by each category.

DT/KMI -- downtime hours divided by the miles driven in each category.

Miles/Veh -- average number of miles driven per each vehicle in each category.

Avg model year -- the average model year of the vehicles in each category.

Fuel, labor, and mat'l $'s per mile -- the total amount spent for fuel, labor, and materials, respectively, in each category divided by the miles driven in that category.

Tot $'s per mile -- the sum of the fuel, labor, and materials expenditures in each category divided by the miles driven in that category.

NAS JACKSONVILLE

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.22	8	6	YES	B(80%)	NO	$0.83	18.47

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	25	8.8%	127	3400	*	$0.04	$0.11	$0.06	$0.21
B	15	5.3%	174	4733	*	$0.09	$0.24	$0.06	$0.39
E	8	2.8%	12	5500	*	$0.04	$0.07	$0.04	$0.16
G	104	36.5%	90	4779	*	$0.06	$0.08	$0.03	$0.17
H	66	23.2%	94	4803	*	$0.06	$0.09	$0.03	$0.19
I	5	1.8%	141	4600	*	$0.05	$0.11	$0.04	$0.20
J	35	12.2%	190	1771	*	$0.09	$0.20	$0.07	$0.35
K	2	0.7%	34	3500	*	$0.06	$0.07	$0.08	$0.22
M	24	8.4%	173	4167	*	$0.07	$0.14	$0.05	$0.26
N	1	0.3%	8	6000	*	$0.05	$0.03	$0.10	$0.18

* THE TRANSPORTATION FUNCTION FOR NAS JAX WAS TAKEN OVER BY PUBLIS
THE "FLEET AGE" RECORDS FOR THEIR FY '92 FLEET ARE NO LONGER AVAILABLE.

NAS ADAK

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.15	4	3	YES	B(90%)	YES	$0.80	$25.00

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	5	2.4%	50	5200	'88	$0.03	$0.06	$0.01	$0.09
B	18	8.8%	94.2	28056	'85	$0.04	$0.03	$0.03	$0.11
G	64	31.2%	121	11687	'84	$0.04	$0.06	$0.03	$0.12
H	68	33.2%	93.2	13441	'86	$0.07	$0.05	$0.03	$0.15
I	13	6.3%	398	7538	'85	$0.07	$0.16	$0.08	$0.31
K	12	5.9%	387	6500	'83	$0.04	$0.13	$0.06	$0.23
M	15	7.3%	992	2333	'82	$0.11	$0.33	$0.12	$0.56
N	10	4.9%	1509	2800	'84	$0.12	$0.30	$0.18	$0.60

NAS MERIDIAN

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.21	12	5	YES		SEMI	$0.86	$20.13

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	7	5.0%	2.8	9286	'89	$0.03	$0.02	$0.004	$0.06
B	2	1.4%	13.6	13500	'89	$0.09	$0.07	$0.01	$0.18
D	1	0.7%	49.8	8000	'82	$0.13	$0.11	$0.02	$0.26
G	57	41.0%	19	4281	'89	$0.05	$0.07	$0.02	$0.14
H	42	30.2%	26.4	5976	'89	$0.07	$0.09	$0.02	$0.18
I	13	9.4%	37.7	6538	'85	$0.11	$0.17	$0.06	$0.34
K	8	5.8%	85.3	3750	'82	$0.12	$0.28	$0.06	$0.46
M	9	6.5%	77	2111	'84	$0.42	$0.41	$0.30	$1.13

NSWC DAHLGREN

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.38	10	4	YES	C(80%)	NO	$0.91	$20.62

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	16	4.7%	38	10063	'88	$0.03	$0.05	$0.02	$0.10
B	1	0.3%	43	3000	'90	$0.08	$0.25	$0.08	$0.41
E	5	1.5%	16	11000	'88	$0.10	$0.04	$0.02	$0.16
G	91	26.8%	6	5495	'88	$0.05	$0.08	$0.04	$0.17
H	120	35.3%	38	6300	'89	$0.05	$0.06	$0.03	$0.14
I	29	8.6%	61	4690	'88	$0.09	$0.18	$0.10	$0.38
J	16	4.7%	70	5313	'85	$0.02	$0.09	$0.05	$0.16
K	30	8.8%	111	4000	'88	$0.05	$0.14	$0.06	$0.25
M	29	8.6%	159	3690	'87	$0.06	$0.19	$0.13	$0.38
N	2	0.6%	41	14500	'92	$0.12	$0.05	$3.56	$3.73

NSWC BETHESDA

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.24	2*	2	YES	C(80%)	NA*	$0.68	$26.96

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	6	5.8%	15	3667	'85	$0.04	$0.14	$0.06	$0.24
B	1	1.0%	119	1000	'79	$0.11	$0.22	$0.65	$0.98
E	10	9.6%	17	10400	'86	$0.03	$0.06	$0.08	$0.17
G	25	24.0%	23	4240	'87	$0.05	$0.09	$0.08	$0.23
H	33	31.7%	16	3818	'80	$0.08	$0.11	$0.06	$0.24
I	8	7.7%	23	4000	'84	$0.11	$0.07	$0.03	$0.21
K	9	8.7%	4	5444	'85	$0.09	$0.03	$0.01	$0.12
M	10	9.6%	20	6800	'83	$0.10	$0.12	$0.13	$0.35
N	2	1.9%	9	21000	'89	$0.10	$0.07	$0.18	$0.34

* NOTE: THE VEHICLE FLEET FOR NSWC BETHESDA IS SPREAD OVER A NUMBER OF ACTIVITIES.

WPNSTA CHARLESTON

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.18	11	4	YES	B(75%)	NO	$0.81	$19.55

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	25	3.9%	38.4	16640	'88	$0.01	$0.05	$0.04	$0.10
B	12	1.9%	153.1	3500	'88	$0.07	$0.19	$0.19	$0.45
E	1	0.2%	0	4000	NO LISTING	NO LISTING	NO LISTING	NO LISTING	NO LISTING
G	266	41.9%	32.3	6917	'88	$0.04	$0.04	$0.03	$0.11
H	129	20.3%	65.4	7248	'88	$0.04	$0.06	$0.05	$0.15
I	74	11.7%	73.1	8500	'87	$0.06	$0.06	$0.06	$0.17
J	11	1.7%	22	4273	'87	$0.03	$0.31	$0.19	$0.53
K	18	2.8%	92	3000	'87	$0.13	$0.27	$0.28	$0.69
M	74	11.7%	99.2	3203	'88	$0.09	$0.19	$0.23	$0.51
N	24	3.8%	332	2250	'86	$0.11	$0.48	$0.44	$1.03

SUBASE NEW LONDON

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.18	8	6	NO	B(60%)	NO	$0.80	$16.78

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	44	16.6%	20.2	8545	'88	$0.04	$0.02	$0.03	$0.09
B	5	1.9%	57.4	3800	'88	$0.11	$0.05	$0.15	$0.31
D	1	0.4%	21.7	23000	'86	$0.07	$0.14	$0.23	$0.43
E	11	4.2%	13.8	9272	'86	$0.02	$0.02	$0.03	$0.06
G	101	38.1%	24	5267	'88	$0.05	$0.10	$0.03	$0.18
H	56	21.1%	4.3	6786	'85	$0.07	$0.12	$0.04	$0.23
I	12	4.5%	40.3	2833	'84	$0.13	$0.04	$0.06	$0.23
J	33	12.5%	35.5	3515	'84	$0.14	$0.07	$0.05	$0.26
K	2	0.8%							

NAWC WARMINSTER

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.22	2	3	YES	C(75%)	NO	$0.80	$21.00

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	10	17.2%	2.4	11200	'85	$0.06	$0.06	$0.05	$0.17
B	2	3.4%	8.4	3500	'77	$0.08	$0.18	$0.18	$0.45
E	3	5.2%	2.7	7667	'87	$0.06	$0.05	$0.04	$0.15
G	11	19%	3.2	4818	'87	$0.06	$0.07	$0.09	$0.22
H	14	24.1%	1.9	7357	'88	$0.06	$0.04	$0.02	$0.13
I	5	8.6%	9.8	1600	'80	$0.13	$0.19	$0.08	$0.40
J	4	6.9%	1.6	1250	'86	$0.08	$0.05	$0.15	$0.27
K	3	5.2%	3.7	5000	'81	$0.05	$0.06	$0.04	$0.16
M	6	10.3%	26.6	2333	'74	$0.07	$0.47	$0.72	$1.26

NAWC LAKEHURST

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.21	5	5	YES		NO	$0.84	$17.14

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	17	8.9%	74	11647	'88	$0.01	$0.06	$0.06	$0.13
B	4	2.1%	964	1500	'86	$0.20	$0.21	$0.05	$0.47
E	10	5.2%	87.7	7000	'86	$0.03	$0.11	$0.05	$0.19
G	53	27.7%	179	4434	'89	$0.07	$0.06	$0.05	$0.19
H	49	25.7%	118	5571	'89	$0.06	$0.07	$0.06	$0.20
I	21	11%	335	4667	'87	$0.13	$0.11	$0.09	$0.33
J	13	6.8%	141	2000	'83	$0.12	$0.09	$0.10	$0.31
K	9	4.7%	805	1778	'90	$0.11	$0.24	$0.08	$0.43
M	13	6.8%	402	3461	'85	$0.05	$0.17	$0.26	$0.48
N	2	1.0%	36	14000	'86	$0.09	$0.02	$0.02	$0.12

NAS CORPUS CHRISTI

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.23	8	5	BEHIND	B(75%)	NO	$0.83	$17.27

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	27	7.9%	91.2	6926	'88	$0.05	$0.09	$0.02	$0.16
B	2	0.6%	781	500	'83	$0.54	$2.80	$0.46	$3.80
E	14	4.1%	214	2500	'86	$0.03	$0.21	$0.05	$0.29
G	185	54.1%	52.8	1789	'85	$0.07	$0.11	$0.04	$0.22
H	26	7.6%	55.2	6692	'87	$0.06	$0.16	$0.03	$0.25
I	11	3.2%	84.6	3636	'84	$0.06	$0.09	$0.04	$0.19
J	11	3.2%	NO OTHER DATA AVAILABLE						
K	17	5.0%	194	2353	'82	$0.10	$0.25	$0.05	$0.39
M	49	14.3%	884	245	'83	$0.09	$0.64	$0.28	$1.01

NAS BRUNSWICK

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.07	3	3	NO	B	SEMI	$0.81	$17.77

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	10	5.5%	38	18100	'86	$0.10	$0.01	$0.003	$0.11
B	4	2.2%	481	3000	'87	$0.04	$0.26	$0.20	$0.50
E	5	2.7%	316	5000	'86	$0.06	$0.12	$0.08	$0.25
F	2	1.1%	19	2000	'80	$0.04	$0.10	$0.05	$0.19
G	43	23.5%	49	10163	'88	$0.01	$0.03	$0.02	$0.07
H	64	35%	56	15375	'87	$0.03	$0.03	$0.01	$0.07
I	24	13.1%	16	34792	'87	$0.01	$0.02	$0.01	$0.03
J	7	3.8%	11	133143	'85				$0.01
K	7	3.8%	65	4571	'86	$0.01	$0.11	$0.04	$0.16
M	11	6.0%	357	1909	'81	$0.05	$0.09	$0.04	$0.18
N	6	3.3%	181	2667	'85	$0.13	$0.14	$0.08	$0.35

NAS OCEANA

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.25	4	5	MOST	B	NO	$0.83	$17.82

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	8	4.1%	253	3000	*	$0.05	$0.07	$0.02	$0.14
B	7	3.6%	105	8286	*	$0.08	$0.14	$0.11	$0.34
E	5	2.6%	54.5	8200	*	$0.05	$0.03	$0.02	$0.09
G	65	33.5%	5.6	7292	*	$0.06	$0.09	$0.01	$0.15
H	52	26.8%	88	5211	*	$0.11	$0.11	$0.02	$0.25
I	26	13.4%	200	3692	*	$0.17	$0.16	$0.09	$0.43
J	10	5.2%	531	2600	*	$0.17	$0.65	$0.33	$1.14
K	9	4.6%	10	4667	*	$0.05	$0.05	$0.02	$0.12
M	13	6.7%	110	3615	*	$0.05	$0.25	$0.15	$0.44
N	1	0.5%	6.6	18000	*	$0.18	$0.11	$0.01	$0.30

* THE TRANSPORTATION FUNCTION FOR NAS OCEANA WAS TAKEN OVER BY PUBLIC WORKS CENTER NORFOLK IN FY '93. THE "FLEET AGE" RECORDS FOR THEIR FY '92 FLEET ARE NO LONGER AVAILABLE.

NAS GLENVIEW

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.33	4	3	YES	B	NO	$0.74	$21.34

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	4	9.5%	49	7143	'87	$0.12	$0.34	$0.05	$0.50
B	6	8.1%	116	4667	'81	$0.21	$0.17	$0.08	$0.46
E	3	4.1%	3	6000	'86	$0.08	$0.03	$0.04	$0.15
G	13	17.6%	29	4846	'87	$0.05	$0.03	$0.06	$0.14
H	24	32.4%	107	4458	'86	$0.05	$0.08	$0.10	$0.23
I	12	16.2%	123	3917	'83	$0.13	$0.55	$0.04	$0.72
J	3	4.1%	154	2667		$0.10	$0.05	$0.09	$0.24
M	6	8.1%	105	3500	'83	$0.05	$0.06	$0.04	$0.15

NAS SOUTH WEYMOUTH

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.21	5	2	NO	B(46%)	NO	$0.81	$18.74

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	12	16.2%	112	13090	'88	$0.05	$0.05	$0.02	$0.12
B	1	1.4%	52	4500	'81	$0.13	$0.25	$0.09	$0.47
E	1	1.4%	53	6000	'88	$0.03	$0.08	NEGLIGIBLE	$0.11
G	13	17.6%	107	4692	'87	$0.06	$0.09	$0.02	$0.17
H	29	39.1%	59	7357	'87	$0.06	$0.07	$0.04	$0.17
I	7	9.5%	127	1600	'84	$0.12	$0.62	$0.24	$0.98
J	1	1.4%	325	4000	NO LISTING	$0.08	$0.80	$0.18	$1.06
K	5	6.8%	78	2864	'84	$0.06	$0.13	$0.05	$0.24
M	5	6.8%	107	2861	'83	$0.11	$0.24	$0.14	$0.49

** NOTES FROM MOST RECENT MANAGEMENT ASSIST VISIT INCLUDE: EXCESSIVE NUMBER OF HIGH MILEAGE TRIPS BEING MADE, NEED NEED TO MONITOR EXPENSES MORE CAREFULLY, NEED TO ESTABLISH UP TO DATE RENTAL RATES FOR REIMBURSABLE CUSTOMERS.

NAS LEMOORE

TOT $'s/MI	NUMBER MECHANICS	NUMBER MGR/ADMIN	DOING PM's	MAIN ASSIGNMENT	REMOTE LOCATION	FUEL COST PER GAL	AVG LABOR RATE ($'s/HR)
$0.13	18	4	?	B	YES	$1.13	$9.52

VEH CODE	#	% OF FLEET	DT/KMI (HRS/KMI)	MILES/VEH	AVG MODEL YEAR	FUEL $'s PER MILE	LABOR $'s PER MILE	MAT'L $'s PER MILE	TOT $'s PER MILE
A	21	8%	493	6285	'86	$0.06	$0.06	$0.07	$0.19
B	14	5.4%	323	11929	'85	$0.13	$0.05	$0.03	$0.21
E	1	0.4%	80	28000		$0.04	$0.02	$0.01	$0.07
G	123	47.1%	167	8797	'87	$0.05	$0.04	$0.02	$0.14
H	55	21.1%	122	13400	'90	$0.04	$0.03	$0.02	$0.11
I	20	7.7%	567	3250	'85	$0.13	$0.10	$0.07	$0.38
K	15	5.7%	939	2133	'85	$0.18	$0.27	$0.16	$0.61
M	12	4.6%	140	11417	'84	$0.05	$0.04	$0.01	$0.10

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